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THE

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OF THE

Field Naturalists' Club of Victoria.

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MAY, 1919, TO APRIL, 1920.

Hon. Editor: MR. F. G. A. BARNARD.

The Author of each Article is responsible for the facts and opinions recorded.

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ILLUSTRATION.

ERRATA.

Page 66, line 24—For "Croydon" read "the Abattoirs."

Page 68, line 7 from bottom—For "Croydon" read "the Abattoirs." (See note on page 88.)

Page 86, line 6—For "acacia seeds" read "insects." (See explanation on page 88.)

Page 97, line 10 from bottom—For "Bell Miners" read "Bell-birds."

Page 104, last line—For "*Hakea rigida*" read "*H. rugosa*." (See text, page 103.)

Page 107—In second paragraph, insert "Mr. F. Keep, Mountfield, Canterbury."

Page 132, line 5—For "*Arthrotaxis*" read "*Athrotaxis*."

Page 135, line 12—Delete words "long mistaken for an insect."

Page 142, line 21—For "*myrsinoides*" read "*lanigerum*."

The Victorian Naturalist.

Vol. XXXVI.—No. 1. MAY 8, 1919. No. 425.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 14th April, 1919.

Mr. J. Gabriel, one of the vice-presidents, occupied the chair, and about forty-five members and visitors were present.

CORRESPONDENCE.

From the Chief Secretary, in appreciation of the Club's congratulatory motion and letter on the firm attitude taken by him with respect to the recent attempt to vary the quail season.

REPORTS.

In the absence of the leader, Mr. A. D. Hardy, F.L.S., a report of the excursion to Macedon on Saturday, 22nd March, was given by Mr. F. G. A. Barnard, who said that about ten members had proceeded to Macedon by the first train and then driven to Upper Macedon, where, after morning tea, the grounds of Government Cottage were inspected, and several rare specimen trees and shrubs seen. The members then proceeded through the pine plantation of the Forest Department to the top of the range, about 3,000 feet above sea-level; thence tracks were followed to Taylor and Sangster's nursery, where the manager pointed out a number of plants which do well only in the higher elevations. Many of the specimen trees were conspicuous by the autumn tints of their foliage. Afternoon tea was taken at "Rosebank," and the party returned to town by the 6 p.m. train.

A report of the excursion to Beaumaris on Saturday, 27th March, was given by the leader, Mr. J. Shephard, who said that about a dozen members, together with some members of the Microscopical Society, had taken part in the outing, which was favoured by fine weather and a suitable tide. Since the last excursion to the locality the electric tram, which covers part of the distance, had been opened, rendering Beaumaris more easy of access. A number of marine worms, polyclads, and nereids had been obtained, also calcareous sponges, of which details would be published later.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. G. P. Webb, Canterbury-road, Canterbury, was duly elected a member of the Club.

REMARKS ON EXHIBITS.

Mr. H. B. Williamson called attention to a number of specimens of the luminous fungus, *Pleurotus candescens*, collected at Clayton, and exhibited their phosphorescent character by affixing them to the blackboard and then turning off the lights for a short time.

DISCUSSION ON PAPER.

The chairman said that the discussion on Mr. Barnard's paper on Western Australia, postponed from last meeting, would then be taken.

Mr. H. B. Williamson asked for information *re* the Sandalwood, which had not been mentioned in the paper. Mr. Barnard said that he had not met with the tree in the parts he had visited, and believed it had a more northerly habitat. Mr. Anthony asked if there was any reason for the paucity of species of ferns recorded for Western Australia. Mr. Barnard said that he could not understand why ferns were not more numerous in the south-west, seeing that the average rainfall was as large as that of the fern gullies of Victoria. Mr. Best asked if there was any accommodation for travellers between Port Augusta and Kalgoorlie. The author replied that Tarcoola seemed to be the only place where there were other houses than those of the railway *employés*.

PAPER READ.

By Mr. H. B. Williamson, entitled "Notes on the Census of Victorian Plants."

The author remarked that for some time he had been of opinion that a number of plants listed in the "Key to the System of Victorian Plants" had not been collected in Victoria, and said that recently he had been given the opportunity of examining certain species at the National Herbarium, which had convinced him that a number of plants were regarded as Victorian on insufficient data, arising mainly from indefiniteness in recording the locality where found. He furnished lists of about 180 species regarding which he considered further information should be sought, and, if possible, undoubted Victorian specimens collected.

Mr. J. Shephard emphasized the author's remarks regarding the correct naming of specimens exhibited or mentioned in reports of Club excursions.

Mr. E. E. Pescott, F.L.S., said that he thought deletions from the list should be made with great caution.

Mr. F. Pitcher, as a member of the Plant Names Committee, considered that the paper would prove very useful to the

committee, and said that he was not in accord with the author when he suggested that because only one specimen of a plant had been found in Victoria such a plant should not appear in the Victorian list.

Mr. P. R. H. St. John also congratulated the author on his good work. He regarded correctness of records as of the utmost importance. He had on one or two occasions called attention to doubtful records in excursion reports.

Mr. J. Searle would not refuse to recognize a plant as Victorian because it had been found in only one locality, and instanced a case in point.

Owing to the lateness of the hour it was decided to postpone the paper by Mr. A. H. S. Lucas, M.A., entitled "A Week Among the Seaweeds at Portsea," until next meeting.

EXHIBITS.

By Mr. C. F. Cole.—Australian Coleoptera from various localities.

By Miss C. C. Currie.—Flowering specimens of various eucalypts, including *E. pilularis*, which had proved a great attraction to Honey-eaters and other birds recently, from Lardner, Gippsland.

By Miss Amy Fuller.—Botanical specimens (undetermined) from sand plains of South-West Australia.

By Mr. C. J. Gabriel.—Marine shells from South Australia: *Stenochiton cymodocealis*, Ashby, and *S. juloides*, Ad. and Ang., with their host plants, *Cymodocea antarctica* and *Posidonia australis* respectively.

By Miss G. Nethercote.—A young Koala or Native Bear from Wilson's Promontory, kept by permission of the Fisheries and Game Department.

By Miss G. Nokes.—Large specimen of the luminous fungus, *Pleurotus candescens*, from Sandringham.

By Messrs. E. E. Pescott and C. French, jun.—Terrestrial orchids: *Diuris longifolia*, R. Br., collected by Rev. A. J. Maher at Cann River, East Gippsland (these specimens have purplish markings, causing the flowers to resemble those of *D. maculata*, Smith); and *Prasophyllum Archeri*, Hook. f., collected by Mr. J. E. Dixon at Warburton, April, 1919.

By Mr. J. Searle. — Crustaceans and polychæte worms, collected on Portarlington excursion, January, 1919; marine worms, &c., collected on Beaumaris excursion, March, 1919.

By Mr. H. B. Williamson.—Specimens of luminous fungus, *Pleurotus candescens*, collected at Clayton by Miss L. Audsley.

By Mr. F. Wisewould.—Fresh specimens of orchid, *Eriochilus autumnalis*, and Native Heath, *Epacris impressa* (crimson variety), from Pakenham Upper.

After the usual conversazione the meeting terminated.

EXCURSION TO RICHMOND QUARRIES.

THE excursion to Richmond quarries on Saturday, 22nd February, announced for aquatic zoology and geology, was attended by about a dozen members, who were favoured with a pleasant afternoon. It was found that by the cessation of quarrying the holes had become filled with water to a greater depth than usual, and consequently the shallow pools, which were usually so prolific with minute life, had disappeared, and with them the unique alga, *Monostroma expansa*, West, which has been found nowhere else. A very uncommon and interesting phenomenon, known as plastogamy, was seen in the heliozoan *Actinophrys sol*, of which many groups of two, and others up to eight in number, were seen uniting. Diatoms were found in myriads, apparently of about six species, including *Bacillaria paradoxa*, which never fails to excite interest, on account of its extraordinary powers of movement. Among other forms found were the protozoans, *Arcella*, sp., *Astasia tricophora*, *Vorticella*, sp., *Pyxicola*, sp., *Vaginicola*, sp., *Urocentrum turbo*, and *Trachelocera olor*. Among the rotifers were *Floscularia ornata*, *Pterodina patina*, *Rotifer vulgaris*, and *Brachionus*, sp. Entomostraca were conspicuous by their absence. Those who were interested in the geology of the locality were somewhat disappointed to find that on the side nearest the railway quantities of rubbish are being deposited with the view of in time filling up the excavations. The quarries nearer the Yarra are, however, still fruitful of interest to the observer, and an effort should be made rather to beautify them for the sake of the geological features which they possess. To the geologist the basaltic flow exhibits several instructive features, the result of variable cooling, tabular blocks, columns, and concentric masses being easily apparent, whilst on the face of the quarries the weathering effects of atmospheric and chemical agencies are seen in the gradual passage of dense basalt upward to the derived clay or bleached product of disintegration. A pleasing feature of the quarries was the number of aquatic birds in the water, seemingly quite at home. About a dozen Black Swans and a small flock of Australian Coots swam about. Several Black and one or two Black and White Cormorants flew restlessly from place to place. Other birds were a Tippet Grebe and a Little Grebe, ceaselessly diving and reappearing, while a Silver Gull completed the feathered company. The birds seemed by their habits to be unmolested. If the quarries are falling into disuse, as appears to be the case, those adjoining the river, containing a considerable expanse of water, could with advantage be reserved for recreative purposes and as a sanctuary for water birds.—J. STICKLAND, J. WILCOX, and C. DALEY.

A SCIENTIST IN THE ANTARCTIC.

By Dr. Griffith Taylor, B.E., B.A., F.G.S., F.R.G.S.,
Physiographer, Commonwealth Bureau of Meteorology.

(*Read before the Field Naturalists' Club of Victoria, 11th Nov.*, 1918.)

Captain Scott's last expedition left New Zealand on the 26th November, 1910. Dr. E. A. Wilson, already known for his Antarctic labours, was chief of the scientific staff, which contained four other scientists from Cambridge. Dr. Simpson, from India, was in charge of the meteorology, while there were three geologists, five biologists, and a physicist in the expedition. Most of the naval officers also took a great interest in the scientific work, and our leader himself was a keen student of the chief features of the Antarctic environment, as his paper on the Ice Barrier (for the Royal Geographical Society) clearly shows.

On the voyage to Cape Evans—which occupied five weeks—the biologists were perhaps the busiest scientists. But the study of the bergs and floe ice, together with the sounding work, gave the geologists much to do. The bergs were driven by the blizzards farther north than the floe ice. They were usually huge tabular sheets torn off from the Great Barrier; but irregular or pinnacled bergs were not uncommon, and these were derived partly from glacier snouts and partly from disintegrated barrier bergs. One of the most interesting was about a mile long, and had originally been tabular. All along the face were enormous vertical joints, broadening into sea-caves below. These had split the berg into columns, so that it was wonderful how it held together; but probably the portion under water had not been eroded by the waves, and still remained fairly solid. At each end was an isolated pillar, a hundred feet away from the main mass, and over a hundred feet high. It exactly resembled the classic geological example of weathering known as "The Old Man of Hoy."

We were imprisoned in pack ice for nearly three weeks, and here made acquaintance with some of the characteristic Antarctic fauna. Snow-Petrels and other sea-birds flew around the rigging, and were occasionally caught by Wilson and Cherry-Garrard in loose snares. Others were shot and retrieved in the dinghy. It was queer work navigating the floes. Many were too slushy to stand on and yet too solid to admit of the boat's passage, so that some of our specimens were perforce abandoned. A few crab-eater seals were shot, and we found it a laborious job to get their heavy, unmanageable carcases aboard. They live on small crustacea chiefly, and their ferocious-looking fanged teeth act only as sifters to free the shrimps from the water; they are, therefore, in function, akin to the whale's baleen. Wilson set up a "flensing" table

on which to lay the skins and carve off the thick layer of blubber which lies just beneath. The hides were rubbed with salt and rolled up for transport. The skeletons, I believe, were roughly cleaned, then dried, and carried quite satisfactorily until they reached the museums.

Nelson and Lillie were busy getting deep sea temperatures by a very ingenious reversing cylinder. This was sunk at the end of miles of piano-wire, and samples of the bottom were also obtained on these lines. Forams and volcanic lava thus obtained were of interest to the geologist; but our queerest collection was a set of specimens from the gizzard of an Adelie Penguin. There were three rock-types represented in this collector's gallery, and only ten years or so before they would have doubled our knowledge of Antarctic petrology!

Microscopic life swarms in these Polar seas. It is stated that there is almost as much protoplasm per acre of ocean as there is in a well-cultivated land crop. Most of this occurs as diatoms and infusoria, forams, and copepods; indeed, almost every floe in its lower layers is stained yellow from the presence of millions of small diatoms allied to *Corethron*.

Early in the new year of 1911 we cruised along the slopes of Mount Erebus. On shore we could see the rookery of the Emperor Penguins, where Wilson's party nearly lost their lives in midwinter, 1911. It was now nearly empty—for this misguided bird lays its eggs in the middle of the long night. A little to the west was one of the largest Adelie Penguin rookeries. Here the rocks were brown with guano, while the seas teemed with shrimps (*Euphausia*), which formed the food of the innumerable Penguins. Along the edge of their territory prowled the killer whales (*Orca gladiator*). I should think the latter animal is as dominant in the southern seas as man is on the land; and when (as happened on three occasions) there was a tussle between men and Orcas on the floating ice, it was the Orcas who gained a strategic victory!

In the *South Polar Times* this biological cycle was described in verse—which should appeal to naturalists, whatever the poets may think of it!

LIFE'S ROUND IN THE ANTARCTIC.

"Big floes have little floes all around about them,
And all the yellow diatoms couldn't do without them;
Forty million shrimplets feed upon the latter,
And the shrimps make the Penguins and the Weddel Seals much fatter.
Along comes the Orca and kills these down below,
While up above the scientist attacks them on the floe.
A bold explorer tumbles down and staves the mushy pack in;
He's crumpled up between the floes—and so they get *their* whack in.
And there's no doubt he soon becomes a patent fertilizer,
Invigorating diatoms—although they're none the wiser.
So the protoplasm passes on its never-ceasing round,
Like a huge recurring decimal—to which no end is found."

We fixed our headquarters on a low promontory in MacMurdo Sound, now called Cape Evans; and after three weeks of hut-building several parties set out for depot work or exploration. The two western parties—of which I had charge—surveyed in considerable detail the western shores of MacMurdo Sound and the adjacent Ross Sea for a distance of a hundred miles. Here the Great Ice Plateau, of 7,000 feet elevation, reaches within twenty miles of the sea; but it is fringed by a range (rising to 13,300 feet in Mount Lister) which can only be traversed *via* the great outlet glaciers. Although some of these had been roughly charted, none except the Ferrar had been topographically surveyed.

Our chief studies, naturally, were concerned with geology, and especially with the evolution of the land surface. Only in two places did we come across any land flora. On a sunny *débris* slope at the snout of the Ferrar glacier we found a carpet of green moss, about sixty feet long, and in a similar situation in Granite Harbour there were thick clumps of peaty moss between the granite boulders. Save for a few lichens and for some algæ in the small lakes, this is all the vegetation in 78° south latitude.

The animal life along the coast has often been described. Weddel Seals were common, especially at the entrance to the Taylor Glacier. Here was a flock of some thirty individuals, and hereabouts also we found a troop of Emperor Penguins awaiting their moulting time. In the moss I was lucky enough to discover the first living insects—some small aptera, about a millimetre long, which I brushed on to seccotined paper, and so embalmed many thousands! These insects must hold the record for hibernation, for they were frozen in an ice film even in midsummer, until I turned them toward the sun, when they moved slowly among the moss hyphæ.

The stratigraphy of Antarctica in this region is very like that of southern Australia. At the base are contorted schists and gneisses like those of Port Lincoln. Above these come red and grey granites of great thickness, forming cliffs two or three thousand feet high. Highest of all is a sedimentary series of yellow sandstones, called the Beacon sandstones. These are of Palæozoic age. The chief feature, however, is a series of colossal dolerite sills (like those of Tasmania), which penetrate the granite in horizontal layers, often a thousand feet thick. One grand section in the Ferrar valley must be almost unique. Above the gleaming glacier is a thousand feet of talus of a brown tint. This reaches up to the red-grey granite. A little higher comes the lower black dolerite sill; then more red granite; then another black sill, and high above this the yellow pinnacles of the Beacon sandstone some 4,000 feet above the glacier.

At Mount Suess, behind Granite Harbour, Debenham found some small plates in the sandstone. We diligently searched the locality, and found numbers of these plates—some bluish, and burnished almost like beetle elytra. They have been assigned to primitive armour-clad fish, and so determine the Beacon sandstone hereabouts as of Devonian age. Far to the south Wilson discovered well-preserved Glossopteris leaves, so that there the sediments and associated coal are akin to our Sydney coal-field. Here, also, Wright found a fine specimen of the primitive Cambrian "coral," *Archeocyathinæ*, in the Beardmore Moraine—near where Shackleton had also found relics of this fauna. In the far north Priestley also added considerably to the Permian flora of East Antarctica, so that the expedition was very successful in fossil fields.

The problem which interested me most was the evolution of a glacial landscape. Research in the Alps and elsewhere has shown that bygone glaciers have carved out great valleys and impressed many peculiar features on alpine scenery. But many problems are still unanswered. Of these the chief are the origin of the cirque (or "armchair") valleys, and the actual mechanism of glacial erosion. In the great scarp bounding the west of MacMurdo Sound is a series of unrivalled cirques. The Walcott Cirque is twelve miles wide, with a rear wall 10,000 feet high, and a small glacier only a few miles wide occupies this great hollow. A complete series in different stages of evolution were mapped along the coast from Mount Morning to Mount Marston. These examples have led to what is, I believe, a somewhat novel theory of land erosion known as the "Palimpsest theory." I believe that the chief carving of the earth's surface in an Ice Age is done, not by glaciers, but by the action of King Frost. The gradual cooling and gradual warming at the onset and waning of the Ice Age extends through much longer periods than the age of maximum glacier development. In these lengthy periods "sapping" or frost-erosion is paramount. At this time most of the cirque valleys so characteristic of alpine scenery are cut out by a sapping process, too complicated to describe here. As the ice-fields increase and the glaciers pour down into the valleys, they carry ice-erosion deeper into the crust, but they often only partly obliterate the earlier erosion by sapping and frost action. Thus, the earlier landscape shows dimly—much as does the earlier writing in the Greek palimpsest. Most geologists have allowed the later erosion to engage their attention too often at the expense of the earlier and (in my opinion) even more important erosion by sapping.

Many of the less fundamental features of ice erosion are most interesting. When a glacier reaches the sea ice it buckles the

latter (often six feet thick) into great pressure waves up to twenty feet high. In similar fashion has the earth's crust been buckled in the process of mountain-building. All round the coast—long after the sea ice has vanished in summer—extends a long terrace known as the ice-foot. This is frozen spray, &c., attached to the land, and might have been invented to form a sledge-track for the explorer! Every cape has a long snowdrift on its leeward side built by the southern blizzards. This hardens to ice *in situ*, and forms a small glacieret. In summer these often dam back small lakes, and we see in miniature the origin of the famous Glenroy Terraces which so puzzled early Scotch geologists. Only rarely in miles and miles of moraine does one come across the scratched blocks which used to be postulated as the indispensable evidence of a glacial deposit. Finally, I would add that Antarctica is too cold for maximum glacial erosion. Infinitely more work is being done by the ice in New Zealand than in Antarctica.

I will devote the last few paragraphs of this article to a brief account of our life in the hut during the long winter night. Captain Scott early instituted a series of forty lectures. These were given, not only by the scientists on all branches of science, but also by Ponting (our camera artist), and by most of the naval officers, on such subjects as travel, clothing, food, surveying, &c. Much time was spent in writing up records of the past summer's sledging, and also in preparing for the ensuing season; but the vicinity of the hut offered many problems of its own. There were great cones of *débris*, up to thirty feet high, which we found to be due to the complete weathering of huge monoliths of kenyte lava. The biologist kept a pool open in the sea ice right through the winter. Here, protected partly by a six-foot wall of ice from the furious blizzards, he dredged and took temperatures. To prevent the delicate organisms from getting frost-bitten, he used to carry them the mile to the hut in a thermos flask! Nearer the hut we had fishing-holes, in which we sunk a wire fish-trap. Many weary half-hours have I spent hauling this contraption up at temperatures down to eighty below freezing! All the fish were *Notothenia*, about eight inches long. Even forty of these (our greatest catch) did not go far among twenty-five stalwart explorers.

In ice-grottos carved out of the living glacier were stationed the magnetographs and the pendulums. Here Simpson and Wright would engage in a "quick run." At this instant all over the earth similar magnetic records were being taken with a view to correlating them with auroræ, sun-spots, magnetic storms, &c.

Sounding balloons were sent up to chart the upper air. They carried meteorographs, which recorded temperature pressure and humidity, and also a fine silk thread, which, like Penelope's web, was supposed to lead one to the fallen treasure ; but either the thread had snapped on an icy pinnacle or else the instrument had drifted over the open water or other accident had supervened. Few of us claimed the chocolate allotted to the successful tracker, but Simpson obtained sufficient records to add greatly to our knowledge of Antarctic aerology.

Lieutenants Evans and Gran spent the spring months in a theodolite survey of the whole vicinity. Debenham and I plane-tabled Cape Evans—one of the coldest jobs I have ever tackled. One could hardly draw accurate lines muffled up as comfort required, and with temperatures of −40° thin gloves soon meant torture.

Through the sleeping hours the night-watchman (*i.e.*, each of the officers in rotation) kept watch in and around the hut. He would cast an eye to the east and see a glow over the crater of Erebus. To the south and east the dancing curtains of the Aurora often flashed across the sky. Usually they were grey or palest green, and were never so vivid as they appear in more northern regions. In foul weather, which occurred five days in the week, it would often be his unpleasant duty to free the pressure-anemometer ("blizzometer") from the blizzard snow. Picture him muffled up and carrying an electric torch round the hut to the base of a frozen ladder. Up this he creeps in the teeth of a gale at seventy miles an hour. Sheets of snow drive past him into the bay, and seem to rock the roof across which he straddles. Here projects the tube of the "blizzometer," and it is his unpleasant duty to excavate the snow therein until the tube is clear and the "blizzometer" registering again. He returns to the shelter of the hut, knowing that it will probably be his lot to repeat the performance before his watch is over.

So passed the long night. Almost all the survivors of the expedition reached England in 1913. The scientific work was put in hand at once, and is being published by the British Museum ; but the Great War has naturally prevented any large output to date. However, nearly a dozen quarto memoirs, dealing with marine biology, penguins, whales, algæ, fossils, &c., have already been published ; and, now that the war is happily over, science will come again to her own, and the publication of the scientific results of Captain Scott's last expedition will proceed apace.

[The paper was illustrated by a large series of lantern slides. —ED. *Vict. Nat.*]

NOTES ON THE CENSUS OF VICTORIAN PLANTS.

By H. B. WILLIAMSON.

(*Read before the Field Naturalists' Club of Victoria, 14th April,* 1919)

THE "Key to the System of Victorian Plants," issued by Baron von Mueller in 1888, contained short descriptions of 1,890 species of plants, including 86 ferns and lycopods, which had been recorded as having been found in various parts of Victoria. This list, with supplementary lists published in the *Victorian Naturalist*, was regarded as our census until 1908, when, on the Plant Names Committee being appointed to consider the question of providing vernacular names for our plants, a "Recording Census" was prepared, under the direction of Professor Ewart, D.Sc., Government Botanist, and chairman of the committee, for the purpose of facilitating the work. Prof. Ewart had already, in the *Naturalist* for January, 1908 (xxiv., p. 144), thrown some doubt on certain Victorian plant records; consequently there were some differences in the two lists, to which he referred in the *Naturalist* of April, 1909 (xxv., p. 200).

The "Recording Census," which provided space for inserting various particulars regarding each species, was placed in the hands of all who might be expected to help in the aim referred to. Since then this list has undergone some slight alterations; deletions and additions have been made, as well as some changes in nomenclature, in order to accord more with the rules adopted at a convention of the world's botanists, and to correct errors that had been made in departing from the nomenclature in Bentham's "Flora Australiensis," so that the Census now contains 2,090 species, and, as 30 species given in the "Key" have been dropped, it follows that the number of species added since 1888 amounts to 230.

All but about a dozen have been added on the strength of plants gathered within the State, the actual specimens being now in the National Herbarium. These 12, together with about 188 species named in the "Key," form the subject of this paper, which, perhaps, ought to have been entitled "The Rare Plants of Victoria."

Now and again apparent errors have come under the notice of the Plant Names Committee during its considerations, and some of us have begun to doubt whether all the species named in the Census have really been gathered in our State, especially in view of opinions the compiler of the "Key" had expressed regarding certain plants growing near the boundaries. The inflation, if any, of our Census is certainly due almost entirely to von Mueller—or "the Baron," as we fondly remember him—and he may have made mistakes. If we investigate these

doubtful records we shall not, I am sure, be accused of trying to discredit him either as a botanist, an explorer, or as a careful observer and recorder, for we know that he was all of these in the highest degree. The types of his published species will stand for many years, and, with Bentham's confirmatory initials, will form a lasting monument to the name of Mueller. But it is to his locality notes and indefinite place names on some of his labels that exception may be taken, and it is just possible that this indefiniteness has caused an inflation of our Census. If a plant has been recorded for Victoria, we should find the specimen in the National Herbarium, but many of our recorded plants are not represented in the Herbarium by specimens labelled with a definite Victorian locality.

With the approval of Professor Ewart, and the kind help of the Herbarium assistants, I had the opportunity, during the recent holidays, of looking into some hundreds of species and examining several thousands of labels at the Herbarium, and from my investigations I have compiled lists including about 180 species which appear to be doubtful records for Victoria.

When looking over the specimens I was impressed with the immense amount of work that had been done by the various collectors—in many cases enthusiasts who looked for no monetary return for their labours. Some, we know, received payment from the Baron, who was known to have used his income to obtain specimens for investigation. This was one of his grievances, and no wonder; he should have had, as every Government Botanist should have, one or more paid assistants, who could be detailed at any time to make field researches to supplement and sustain laboratory work.

As to my method of investigation: I, of course, used my own herbarium as a guide. This contains 2,060 Victorian species, 1,300 of which had been collected by myself. Of the remainder, 360 were received in a fresh state from correspondents in different parts of Victoria, so that I had to confine my attention to about 400, more than half of which are represented in my collection by specimens gathered in other States. A copy of the "Australian Census," written up to date, showing the whereabouts of each species, was placed at my disposal, so that it took only a minute or two to obtain the required species. I am grateful for the assistance given to me in the work by Mr. J. R. Tovey, senior Herbarium assistant, of whose thorough knowledge of the institution and good memory for references I took the fullest advantage.

It was to me very interesting work, and I am much indebted to Professor Ewart for the privilege. On looking into the folders and reading the labels I came across interesting type-

specimens (from which the plants were described), and there, also, I saw sprigs gathered in such widely-separated places as Victoria River and Roper River, Northern Territory, King George's Sound, Lord Howe Island, Menindie, Geraldton, Alice Springs, and I was sorely tempted to halt and study the varying forms due to diverse climatic conditions or differences of altitude, but for this there was no time. Accounts of early voyages and inland journeys were recalled by the specimens labelled with the following names as collectors :—Banks and Solander (1770), Robt. Brown (1802), Allan Cunningham (1817), Mitchell (1836), Dr. Leichhardt (1840), F. Mueller (1853–55), and those Victorian collectors of later years—Dallachy, who collected chiefly in the North-West and the Grampians ; Dr. A. W. Howitt, Gippsland ; and Bauerlen, East Gippsland. Other names occurring frequently on Victorian specimens were Reader (S. and N.W.), Walter (general), Allitt (S.W.), Fullagar (S.), Jephcott (Hume R.), Sullivan (Grampians), Tisdall (Walhalla), Whan (Skipton), French and Stirling (Alps), D'Alton (N.W.), Macmillan (Gippsland), Findlay (Towong), Campbell (Grampians), Wilhelmi (N.W. and S.W.), Bacchus (Ballarat), Adamson (Melbourne), Curdie (Camperdown), Hannaford (Warrnambool), J. B. Wilson (Geelong), Robertson (S.W.), Eckhert (N.W.), Lockhart Morton (N.W.), and that enthusiastic lady collector, Mrs. M'Cann (Mitta Mitta). Almost all the Victorian specimens before 1890 were collected by those mentioned, Mueller standing first for number of species. Since that year specimens have been sent along by a few collectors, some of whom, in his characteristic original way, the Baron styled his " kind phytographic collaborateurs."

Two aims have been before me in preparing this paper : to draw attention to certain supposed Victorian species with a view to stimulating botanical workers in their field research work, and to put in a plea on behalf of the National Herbarium, of which Victorians should be proud. With regard to the former, the plants in question may be regarded as non-Victorian as far as the present botanical workers are concerned, so that any discoveries of them in our State can be considered creditable to those who make them. Hence the necessity for publishing a list of them, and which ought to result in a more accurate and complete census. More than half of the 180 in question have probably not been gathered since Mueller obtained them himself during those early journeys in 1853–55 which were so tersely described and mapped out by Mr. F. G. A. Barnard in his interesting paper in the *Naturalist* for June, 1904 (xxi., p. 17).

Many of these plants are labelled " Munyang Mt.," " Nungatta Mt.," " Sources of Snowy and Murray," " Mt. Imlay," " Lower Murray," none of which are definite Victorian localities. It

is probable that some of these species were actually collected by Mueller in New South Wales and South Australia, since, from remarks he made, verbally and otherwise, he considered that plants gathered within a day's walk across the border should be credited to Victoria. In his first edition of the "Census of Australian Plants" (1882) he says:—"The geographic columns in these pages indicate simply the occurrence of plants within any of the colonial areas, but have been extended even to such species which merely may pass boundary lines." From this it would appear that in compiling his "Key" he had credited Victoria with those plants which, being near the boundary, might reasonably be expected to be met with on this side of it. In the case of some of them this expectation has been realized, while in many others it has not, no Victorian specimen being found in the Herbarium. In Bentham's "Flora," among Victorian localities are mentioned "Munyang Mt." Under this indefinite and now disused name Mueller, I think, included all those species he gathered on his journey along "the highest summits of the Alps," from the Cobberas (in Victoria) to Kosciusko (N.S.W.) Nungatta Mt., in which the Genoa River takes its rise, is some miles east of the border. Mt. Imlay is in New South Wales, south-west of Twofold Bay. These are, of course, also mentioned as New South Wales localities. "Upper Snowy," "Head of Genoa," are among Victorian localities, though both of these rivers rise in New South Wales. I think that Victoria has also been credited with plants gathered in the Riverina and the "Murray desert" below the South Australian border. Such places as Cudnaka and Lake Victoria are given on the labels of some plants which appear on our Census, of which no other specimens can be found in the parcels. For instance, *Pultenæa densifolia* is labelled "Lower Murray"; this, I feel sure, means South Australia. Mr. D'Alton sent it in later from "across S.A. border."

It must be conceded that in those early days definiteness in place names was not easy to get, and, also, it did not seem so necessary, so that writing "Near Murray," or just "Murray," which occurs on so many labels, seemed the best that could be done, especially considering the difficulties of the wayback collector.

It would appear that no collector has since 1854 travelled along the routes of Mueller in the North-West, and to Cobberas and Kosciusko (Munyang). If he has, he did not record the result. There is a good field for botanists in those two areas alone. Who will undertake them?

Regarding the absence of these recorded species from our Herbarium, several reasons may be advanced. Some may have been lost or mislaid, and thus missed getting into their

parcels. We know that Mueller did a great deal of his systematic work at his private house, but he was very careful with specimens and labels, and I was surprised to see so many of the scraps I sent to him placed in their proper parcels, with correct dates and localities, for I had considered them scarcely worth keeping. Just one exception may be mentioned. A Pultenæa I had sent him was labelled "Wannon R., Port Fairy"! The fact that so many that are missing are "boundary" plants seems to me significant. Some of the missing specimens may have been put into what are known as supplement parcels, and may turn up yet. These parcels contain specimens which require further examination to determine the species. Some, of course, I may have missed, but my lists need not be condemned on that account, for I intend them to be considered as merely tentative.

If, on looking over the lists, some collector notes any that he has had determined by an authority, it is hoped that he will communicate with Prof. Ewart. A specimen gathered in Victoria would, however, be required for the species to be recorded; and here I may express the opinion, shared by other workers, that observers and excursionists have had plants recorded in the *Naturalist* on the strength of a passing glance or of hearsay, without any specimens being secured for determination. On looking over accounts of excursions of our Club—valuable and interesting as these outings are—I have come across mention of plants which, I feel sure, cannot have been seen on the occasion, and for which probably some commoner species has been mistaken. And this brings me to a point worthy of the consideration of the committee—the desirability of having accounts of excursions placed before a small committee of botanists before publication, with a view to preventing errors in scientific records occurring in print. Certainly I think that no record of any of the plants in my lists should be allowed unless a specimen has been submitted for determination and for placing in the Herbarium. Our journal is recognized as a scientific one, and it is a pity to see in it these inaccuracies, which stand uncorrected, but for which the hon. editor is in no way responsible. Surely writers would not mind the editor, at the instance of the "censors," deleting or querying any doubtful species name.

As to the claims of the National Herbarium, I consider that if the lists referred to were noted and made use of, two good purposes would be served: correct records would be established, and the Herbarium would be furnished with a supply of fresh specimens, which are always acceptable for replacing those damaged or sent away in exchange. The least collectors should do in exchange for information received is to supply good specimens fresh from the field.

Coming to the matter of revising the Census, it may be asked whether I would advise cutting out all the species not now represented in the Herbarium by Victorian specimens. Since 1888 30 of the species in the "Key" have been dropped, 10 of these because they have been included in another species, while it is probable that several of the remaining 20 have been dropped simply because there is no Victorian specimen. Perhaps it would scarcely be wise to drop out 180, but I think that, in any future edition of the Census, or in a new "Flora of Victoria" (which is eagerly looked for), it would suffice if those plants were marked, say, with an asterisk, to denote "doubtful record for Victoria." It is quite true that to include in any future "Key" a description of these would render such a book more useful, seeing that a Victorian field-worker might reasonably expect to find them near the boundary, and perhaps that was in the Baron's mind when he compiled his "Key."

One disturbing thought regarding these rarely-gathered species is that, owing to the advance of settlement and consequent grazing and prevalence of fires, some of them may now be quite extinct in our State, and even in Australia. In a letter from a fellow-member, Mr. E. H. Lees, of Mallacoota, he deplores this probability, and mentions that some plants, notably *Nephelium leiocarpum*, are almost unknown where a few years ago they were frequent in his district. This thought should stimulate us to investigate the localities where these rare plants may be found before a greater evil comes upon them—their total extinction.

In my investigations I did not need to trouble about the eucalypts or the orchids. Both these have been worked well by specialists, notably Messrs. P. R. H. St. John in the former and Messrs. French, Pescott, and Braine in the latter. So well have they worked that the number of eucalypts has been increased from 36 to 66, and that of the latter from 75 to 119. These increases account for about one-third of the total species added to the "Key," and they are still going strong! With only one exception, I think we know where all these 285 species are to be found—or perhaps I should say *were* to be found, in the case of the orchids. The exception is *Drakea irritabilis*, the interesting "Hammer Orchid." No one knows where, when, or by whom this was found in Victoria, and there are in the National Herbarium only three or four specimens from New South Wales and Queensland; but Mr. C. French, jun., who assisted in the work connected with the compiling of the "Key," tells me that the Baron showed him with delight a specimen of that orchid which he had just received from "East Victoria," but no record of the date, locality, or collector's name can be found, and the specimen itself has disappeared.

The following are the lists referred to, and botanical workers of Victoria in general, and Professor Ewart, Curator of our Herbarium in particular, would esteem it a favour if those in charge of Herbaria in other States who read them, and who have any Victorian specimens of the plants, would forward them to Melbourne for examination and record.

List No. 1.

Plants represented in the Herbarium only by specimens labelled with definite N.S.W. and S.A. localities, and no printed record. Those not named in the "Key" marked.*

(a) Plants Recorded from North-Western District.

Hibiscus Krichauffi, F. v. M.
Euphorbia erythrantha, F. v. M.
Dodonæa lobulata, F. v. M.
*Gunnia septifraga, F. v. M.
Chenopodium auricomum, Lindl.
*Didymotheca thesioides, Hk. fil.
*Didiscus glaucifolius, F. v. M.
Podolepis Lessoni, Benth.
*Leptorrhynchos panætioides, Benth.
Helipterum strictum, Benth.
*H. læve, Benth.
Centipeda thespidioides, F. v. M.
Goodenia cycloptera, R. Br.
Sarcostemma australe, R. Br.
Heliotropium asperrimum, R. Br.
Corynotheca lateriflorum, F. v. M.
Crinum flaccidum, Herbert.
*Xerotes dura, F. v. M.
*Panicum bicolor, R. Br.
P. Mitchelli, Benth.
*P. trachyrachis, Benth.
*P. parviflorum, R. Br.
Neurachne Munroi, F. v. M.
Andropogon annulatus, Forst.
A. gryllus, L.
Aristida leptopoda, Benth.
Notholæna Brownii, Desv. (Cheilanthes vellea).
Blennodia Lucæ, F. v. M.
Calandrinia brevipedata, F. v. M. (S.W.)
Scævola crassifolia, Labill. (S.W.)
Augianthus tenellus, Benth.
A. pusillus, Benth.

(b) Plants Recorded from East Gippsland.

Zieria cytisoides, Smith.
*Dodonæa tenuifolia, Lindl.
Desmodium brachypodum, A. Gray.
Acacia vestita, Edwards.
A. glaucescens, Willd. (N.E.)
Homoranthus virgatus, A. Cunn. (Darwinia virgata).
Melaleuca hypericifolia, Smith.
Pomaderris cinerea, Benth.
P. ligustrina, Sieb.
P. obcordata, Fenzl.
Daviesia Wyattiana, Bailey.
Cryptandra Scortechinii, F. v. M.
Cissus (Vitis) Baudiniana, Brouss.
Panax Murrayi, F. v. M.
Xanthosia Atkinsoniana, F. v. M.
Actinotus Helianthi, Lab.
A. Gibbonsii, F. v. M.
Santalum obtusifolium, R. Br.
Notothixos incanus, Oliver.
Isopogon anemonifolius, R. Br.
Conospermum taxifolium, Smith.
Persoonia revoluta, Sieb.
P. oxycoccoides, Sieb.
Grevillea triternata, R. Br. (N.E.)
Vernonia cinerea, Less.
Cassinia quinquefaria, R. Br.
Ammobium alatum, R. Br.
Glossogyne tenuifolia, Cass.
Prostanthera incisa, R. Br.
P. violacea, R. Br.
P. saxicola, R. Br.
Westringia rosmarinifolia, Smith.
Myoporum tenuifolium, G. Forst.
Ehretia acuminata, R. Br.
Epacris crassifolia, R. Br.
*Smilax glyciphylla, Smith.
Tricoryne simplex, R. Br.
*Drakea irritabilis, G. Reich.
Andropogon australis, Spreng.
Lycopodium Carolinianum, L. (L. varium) (N.E.)
*Cystopteris fragilis, Bernh.
Aspidium tenerum, Spreng.
Hypolepis tenuifolia, Bernh.
Asplenium nidus, L.
A. felix femina, Bernh.

LIST NO. 2.

No specimens except those labelled "Munyang Mt." (M.), "Sources of Snowy" (S.), "Nungatta Mt." (N.)

Ranunculus Muelleri, Benth. (M.)
R. anemoneus, F. v. M. (M.)
Blennodia alpestris, F. v. M. (S.)
Colobanthus (Benthamianus) subulatus, Hk. f. (M.)
Scleranthus mniarioides, F.v.M.(M.)
Drapetes Tasmanica, Hk. f. (M.)
Azorella Muelleri, Benth. (M.)
A. dichopetala, Benth. (M.)
Seseli algens, F. v. M. (M.)
Oreomyrrhis pulvinifica, F.v.M.(M.)
Persoonia myrtilloides, Sieb. (N.)
Parantennaria uniceps, F. v. M. (M.)
Rutidosis leiolepis, F. v. M. (S.)
Abrotanella nivigena, F. v. M. (M.)
Plantago stellaris, F. v. M. (M.)
Veronica densifolia, F. v. M. (M.)
Euphrasia antarctica, Benth. (M.)
Scutellaria mollis, R. Br. (N.)
Epacris robusta, Benth. (S.)
Agropyrum velutinum, Nees.
Lycopodium selago, L. (M.)
Gratiola nana, Benth. (M.)

LIST NO. 3.

No specimens except those labelled with no more definite locality than "Murray," "Murray desert," "Lower Murray," "Murray and Darling."

A number may have been gathered by Mueller on this side of the river, but some were sent to him by residents of Wentworth and some gathered by Dallachy and others, who collected in both States and along the Darling. All are doubtful records.

Capparis Mitchelli, Lindl.
Cardamine eustylis, F. v. M.
Blennodia (Erysinum) curvipes, F. v. M.
Lepidium phlebopetalum, F. v. M.
Drosera Indica, L.
Geijera parviflora, Lindl.
Sida intricata, F. v. M.
Poranthera ericoides, Klotsch.
Phyllanthus Fuernrohrii, F. v. M.
P. lacunarius, F. v. M.
P. trachyspermus, F. v. M.
Dodonæa Baueri, Endl.
Trichinium (Ptilotus) nobile, Lindl.
T. alopecuroides, Lindl.
Amaranthus macrocarpus, Benth.
Hemichroa (Polycnemon) diandra, R. Br.
Atriplex limbatum, Benth.
A. rhagodioides, F. v. M.
A. spongiosum, F. v. M.
A. vesicaria, Heward.
A. Muelleri, Benth.
Kochia lanosa, Lindl.
K. triptera, Benth.
K. oppositifolia, F. v. M.
Chenopodium cristatum, F. v. M.
Bassia tricornis, F. v. M.
B. biflora, F. v. M.
Rhagodia crassifolia, R. Br.
Pachycornia (Salicornia) robusta, Hk. f.
Mollugo cerviana, Seringe.
Pimelea simplex, F. v. M.
Pultenæa densifolia, F. v. M.
Psoralea eriantha, F. v. M.
Cassia desolata, F. v. M.
Swainsona Greyana, Lindl.
Acacia Sentis, F. v. M.
A. continua, Benth.
Brachycome melanocarpa, Sond. and F. v. M.
B. basaltica, F. v. M.
*Minuria denticulata, Benth.
Calotis microcephala, Benth.
C. plumulifera, F. v. M.
Olearia (Aster) subspicata, Benth.
O. Hookeri, Benth.
Podolepis rhytidochlamys, F. v. M.
Leptorrhynchos ambiguus, Benth.
Chthonocephalus pseudevax, Steetz.
Elachanthus pusillus, F. v. M.
Jasminum lineare, R. Br.
Marsdenia Leichhardtiana, F. v. M.
Solanum lacunarium, F. v. M.
Prostanthera Behriana, Schlech.
Eremophila polyclada, F. v. M.
E. alternifolia, R. Br.
E. scoparia, F. v. M.
E. oppositifolia, R. Br.
Calostemma purpureum, R. Br.
Eriocaulon electrospermum, F.v.M.
Panicum repens, L.
P. cœnocolum, F. v. M.
Spinifex paradoxus, Benth.
Andropogon bombycinus, R. Br.
A. micranthus, Kunth.
Anthistiria gigantea, Cav. (A. avenacea).
Aristida arenaria, Gaud.
A. calycina, R. Br.
Danthonia bipartita, F. v. M.

LIST NO. 4.

No Victorian specimens other than those recorded from Genoa River, which runs part of its course through New South Wales.

Pittosporum revolutum, Aiton.
Phebalium (Eriostemon) Ralstoni, Benth.
Lasiopetalum parviflorum, Rudge.
Claoxylon australe, Baill.
Homalanthus Leschenaultianus, F. v. M.
Trema (cannabina) aspera, G. Forster.
Ficus scabra, G. Forster.
Halorrhagis monosperma, F. v. M.
Pteris longifolia, L. (rep. Snowy River).

In addition to these lists I have compiled one containing 250 species which have been collected very rarely in Victoria —in most cases in one locality only. It indicates localities, and in many cases gives collectors' names and number of specimens in the National Herbarium. This it may be considered advantageous to publish at a later date.

THE LOCH VALLEY.—The extension of the Neerim railway to Noojee, a distance of about thirty miles from Warragul, which was opened on the 30th ult., opens up another interesting district to tourists and nature-lovers. Loch Valley must not be confounded with Loch (township) on the Bass River, between Nyora and Korumburra, many miles south of Warragul. From Noojee it will be possible, in a walk of about eighteen miles—the greater part through interesting forest scenery—to reach that well-known hostelry, M'Veigh's, on the Yarra, about twenty miles above Warburton, and virtually the start of the Baw Baw track. The Noojee station is situated almost on the bank of the Latrobe River, a little below the confluence of the Loch, and about a mile above the junction of the Toorongo. All of these streams abound in picturesque scenes, and their gurgling waters are pleasant company as one wanders in their neighbourhood. The Neerim district was once celebrated for its huge trees, but these have disappeared and made way for smiling pastures. The tourist who wants to see big timber must make his way farther north up the Loch Valley to Mount Horsfall and Whitelaw's track, on the divide between the Yarra and Latrobe ; here he can see giants upwards of 250 feet to the first branch and of great girth. Near Nayook, a station about eight miles before reaching the terminus, is situated the celebrated Nayook Glen—a magnificent assemblage of ferns and beeches—which has been made accessible to tourists by tracks and a look-out. This is situated on a tributary of the Tarago, another stream which abounds in beauty spots. One of the features of the new railway are the immense trestle bridges spanning some small creeks on their way to the Latrobe. On one of these the rails are 95 feet above the creek below, while the bridge itself is 600 feet long.

These were pictured in the *Leader* of 19th April. There are also some very interesting cuttings through Ordovician formations in which the strata are particularly well marked. The tourist also has the chance of travelling from Nayook up the Latrobe to Powelltown, about 16 miles, whence a steam tram, ten miles in length, connects with the railway at Yarra Junction. A small party of members of the F.N.C. visited the district at Easter, and were very pleased with their outing. Nice falls, or cascades, occur on tributaries of both the Loch and the Toorongo, and can be reached with a little exertion ; but without leaving the road tree-ferns, beeches, and giant blackbutts, with all their attendant undergrowth, in endless profusion, can be seen, almost untouched by the hand of man.

The Green Mountains : Queensland's National Park.—Under this heading, Mr. A. H. Chisholm, in the *Sydney Mail* for 5th March last, gives an interesting description, illustrated with characteristic scenes, of Queensland's National Park, an area of 47,000 acres, situated in the Macpherson Range, which is practically the boundary between New South Wales and Queensland. The fact of the reservation is largely due to the perseverance and energy of a young resident of the district, Lieut. W. R. Lahey, who, while studying at the Sydney University, spent all his vacations in unravelling the intricacies of the mountains. The vegetation is superb, and, as an elevation of 4,000 feet is attained in some places, there should be considerable variety in it. The Brisbane Field Naturalists' Club spent a week there during the recent summer, but, as little has yet been done to open up the area, they found the difficulties of investigation rather severe. The Park is distant from Brisbane about 70 miles, and from one of its highest points Moreton Bay and Stradbroke Island can easily be made out. Among the trees to be seen there are venerable specimens of the Antarctic Beech, *Fagus Mooreii*, cedars, pines, and flame-trees, while the Queensland Waratah, *Embothrium Wickhami* (var. *pinnata*), has recently been recorded for the area. The birds are numerous, and in several instances almost unique. Lyre-birds, Mountain Thrushes, Black-faced Flycatchers, Scrub-Wrens, Pigeons, Parrots of many sizes and colours, Eagles, Cat-birds, Bell-Miners, Dragoon-birds, Rose-breasted Robins, are among those noted, while that rare bird, the Rufous Scrub-bird, *Atrichornis rufescens*, has also been seen there. Though the male of this bird was described by the late Dr. E. P. Ramsay so long ago as 1865, and the nest and eggs were first discovered by Mr. S. W. Jackson on the Bellinger River in 1898, the female bird has not yet been taken. The bird is a wonderful mimic, and in its attitudes greatly resembles the Lyre-bird.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th May, 1919.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about fifty members and visitors were present.

ELECTION OF MEMBER.

On a ballot being taken, Mr. J. G. Thompson, 16 Collins-street, Melbourne, was duly elected a member of the Club.

GENERAL BUSINESS.

Nominations were made for office-bearers for the year 1919–20, and Messrs. F. Keep and F. Wisewould were elected to audit the accounts for 1918–19.

On the motion of Messrs. F. G. A. Barnard and H. B. Williamson it was resolved that a letter be sent to Mr. D. Le Souëf, C.M.Z.S., sympathizing with him in the recent attack made on him by footpads, and expressing the hope of the members that he would have a speedy recovery from his injuries. The president said that, on hearing of the assault, he had at once written in the name of the Club and expressed sympathy with Mr. Le Souëf.

PAPERS READ.

1. By Mr. A. H. S. Lucas, M.A., B.Sc. (hon. member), entitled "A Week Among the Seaweeds at Portsea."

In the absence of the author, who is a resident of Sydney, the paper was read by Mr. F. G. A. Barnard.

The author gave a chatty account of a week's seaweed collecting at Portsea, almost on the extremity of the Nepean Peninsula, and quite close to Port Phillip Heads. Here, with both ocean and bay beaches available, he collected just one hundred species, some of them being new for Victoria. He remarked on the richness of the marine algal flora of Victoria and the good work done by the late Mr. H. T. Tisdall and the late Mr. Bracebridge Wilson, both members of the Club, and urged that further work should be taken up by some members of the Club.

Mr. J. Gabriel said that he considered dredging gave the

best results in searching for seaweeds. He had collected 67 species in one day at Western Port. He offered to give a demonstration on mounting seaweeds for the Herbarium on some suitable occasion, and called attention to his exhibit of a collection made many years ago by the late Mr. H. Watts, one of the original members of the Club.

Mr. C. J. Gabriel said he was pleased to know that the marine plant *Cymodocea antarctica* is to be found in Port Phillip Bay. At the previous meeting he had exhibited some small shells found on the plant, which had been forwarded from South Australia ; he would now try if the mollusc occurred here.

2. By Mr. J. Booth, M.C.E., B.Sc., entitled "About 'Pet Peter,' a Flying Phalanger."

The author gave an interesting account of the life of a Lesser Flying Phalanger, *Petaurus breviceps*, Waterhouse, commonly known as the Small Flying Squirrel, which had been kept in captivity for a period of nearly six years, when it apparently died of old age. Being a nocturnal animal, it was, of course, difficult to watch all its movements. It seemed to recognize its usual caretaker, and made sugar and milk-soaked bread its staple diet, though it was fond of an occasional cockroach.

Mr. J. A. Kershaw, F.E.S., remarked on the happy way in which the author had described his pet's peculiarities, and, referring to its food of insects and honey, asked whether it ever ate gum (Eucalyptus) leaves.

Mr. A. D. Hardy, F.L.S., said that he had had no experience with the Phalangers, but he had recently been inquisitive as to the food of a Queensland Koala (Native Bear) kept by a travelling circus, when he was informed that its favourite food was the leaves of the Sugar Gum, *Eucalyptus cladocalyx*. He had tried it with leaves of *E. Delegetensis*, but they had been refused. The animal had never been known to drink during the three years it had been with the circus, apparently obtaining all the moisture it required from the gum-leaves.

Mr. Booth, in reply, said gum-leaves had been offered to "Pet Peter," but he did not appreciate them.

EXHIBITS.

By Miss C. C. Currie.—Fruiting specimen of *Billardiera longiflora*, Lab., Purple Apple-berry, from Loch Valley ; fronds and sporocarps of Nardoo, *Marsilea quadrifolia*, L., grown at Lardner.

By Mr. J. Gabriel.—Collection of Victorian seaweeds made by the late Mr. H. Watts (one of the founders of the Club), principally at Warrnambool, 1858–66.

By Mr. C. Daley, F.L.S.—Asbestos, showing gold deposited by precipitation, from South Queensland.

By Mr. J. E. Dixon.—Dried specimens of two rare Victorian plants, *Jasminum lineare*, R. Br., and *Calostemma purpureum*, R. Br., collected by exhibitor near Lake Hattah, Northern Mallee.

By Mr. A. L. Scott.—Rocks and clay containing crystals of gypsum, from Mornington beach, Port Phillip; granite from Mount Eliza, near Frankston.

By Mr. J. Searle.—Slides of the benign tertian malaria parasite, *Trypanosoma evansi*, under the microscope.

After the usual conversazione the meeting terminated.

Addendum to April Report.

By an inadvertence Mr. H. B. Williamson's reply to the criticism on his paper was omitted. It was to the effect that he had not suggested that if only one specimen of a plant had been found in Victoria it should not appear in the Victorian list, neither did he venture the opinion that any of the plants contained in his lists should be omitted from the census.

The Western Australian plants exhibited by Miss Amy Fuller have been determined by Prof. A. J. Ewart, D.Sc., Government Botanist, as follows:—*Banksia Baueri*, R. Br.; *Callitris Roei*, Beath; *Grevillea eriostachya*, Lind.; *Hakea Baxteri*, R. Br. (in the absence of fruit this species is very difficult to distinguish from *H. Brownii*); *H. commutata*, F. v. M., in fruit (this species seems to be rather rare—no fruil specimen in the Herbarium previously); *H. multilineata*, Meissn.; *Helichrysum obtusifolium*, Sond. and F. v. M.; and *Physopsis spicata*, Turcz.

Australian Trees and Shrubs.—With the desire of bringing more directly under the notice of those who contemplate beautifying the surroundings of their homes the value of Australian trees and shrubs for that purpose, Mr. E. E. Pescott, F.L.S., F.R.H.S., Government Pomologist, commenced a series of articles in the *Journal of Agriculture, Victoria*, for March last, on "The Australian Flora from an Ornamental Aspect," dealing in the opening article with some of the eucalypts or gum-trees. Seeing that the author is a practical man, and such a lover of Australian vegetation, the articles cannot fail to supply a want which has often been experienced both by public and private persons desiring to plant to the best advantage.

NOTES OF A VISIT TO WESTERN AUSTRALIA.

By F. G. A. BARNARD.

(*Read before the Field Naturalists' Club of Victoria, 10th March*, 1919.)

In August last, having persuaded myself that I needed a holiday, the question arose, Where shall I go? Then, remembering Mr. C. A. Topp's interesting paper, "Impressions of the Wild-Flowers of South-Western Australia," read before this Club just two years ago (*Vict. Nat.*, xxxiv., p. 37, July, 1917), and that the best time of the year for wild-flowers was fast approaching, I determined to try and arrange for a visit to Western Australia. As time was a matter of importance, I decided to make the journey by the recently-opened Trans-Australian railway, having been informed that at that time of the year the trip by rail would be quite pleasant. So, leaving Melbourne on Wednesday afternoon, 28th August, by mid-day on the following Sunday I had traversed some 2,168 miles, and practically crossed the continent from east to west, with nothing to regret in having adopted that route, and having gained a lasting impression of the Nullabor Plain, said by Mr. T. Dunbabin, in an article in the *Argus* of 3rd August last, to be the greatest plain in Australia, covering about 100,000 square miles—an area greater than the State of Victoria.

Some little account of items interesting to the naturalist on the overland journey may be worth while. In Victoria, owing to the shortness of the daylight, little was to be seen. The new lake in the Werribee Valley, near Melton, with its gaunt skeletons of trees standing in fifty or sixty feet of water, had anything but a picturesque appearance. My last glimpse of the vegetation consisted of some golden wattles in full bloom near Rowsley. When daylight broke next morning we had almost traversed the so-called Ninety-Mile Desert, which is really an ordinary piece of Mallee, with stunted gums, Casuarinas, Hakeas, &c., but nothing definite could be recognized. In South Australia, about Mount Barker Junction and right through the Mount Lofty Ranges, golden wattles were everywhere in evidence, and presented a lovely sight; by the way, the South Australian form of *Acacia pycnantha* seems to be more robust both as to flowers and leaves than the specimens we are used to in Victoria. The Native Heath, *Epacris impressa*, both pink and white, was still blooming freely all through the hills, and with the yellow of the wattles made up a picture worth travelling far to see.

On leaving Adelaide for Port Augusta (260 miles) all was new to me. The country was under wheat to so great an extent that little natural vegetation was to be seen. Along the railway line the introduced Oxalis, *O. cernuta*, grew in

abundance for miles and miles. At Peterborough (formerly Petersburg), where the line from Broken Hill to Port Pirie crosses the north line, a train-load of zinc tailings on its way to the smelting works at the latter place was seen. A few miles beyond here numbers of native melons were noticed in the railway enclosure. Some very dry, rocky country was entered near Eurelia (1,733 feet above sea-level), where we stopped for tea. Daylight disappeared soon after. At Quorn (234 miles, 961 feet) the Oodnadatta line branches off, and, going north, penetrates 450 miles further towards the heart of Australia. From Quorn to Port Augusta is the most picturesque part of the South Australian portion of the line, now narrow gauge, but this was traversed in the dark. Coming back three weeks later the early morning was just light enough to be able to get an idea of the Pichi Richi Pass, through which the line rises about 1,300 feet in 25 miles. The hills were very abrupt and stony, and only sparsely covered with moderate-sized trees.

Leaving Port Augusta punctually at 10.30 p.m. on the long run of 1,050 miles to Kalgoorlie, nothing was, of course, seen till nearing Tarcoola (257 miles), when, as daylight appeared, it was seen that we were passing through country similar to that of the Ninety-Mile Desert, between Serviceton and Murray Bridge. It is unfortunate that the train on both its east and west-bound journeys passed through the stretch of salt lakes between Wirrappa and Wirraminna (about 80 miles) during darkness, as, though probably unpicturesque, there should be a certain amount of variety in them. However, I managed to get a glimpse of one by moonlight on my return journey. During the short stoppage at Tarcoola I was able to obtain specimens of the travertine limestone, which outcrops along the line, and has been used extensively for ballast. Tarcoola was expected at one time to prove a good goldfield, but the difficulty of procuring water in such dry country has greatly retarded its mining possibilities. Signs of the industry can be seen some two miles away, to the north of the line.

Seeing that the Trans-Australian line is laid down east and west within a few miles of the same parallel of latitude—31° S.—and the range of elevation during the 800 miles between Pimba (113 miles) and Zanthus (921 miles) is only 270 feet, and that not a running stream or even a dry creek-bed is seen in all that distance, much variation in the vegetation cannot be expected; still, at the time of year I crossed (30th, 31st August), which is probably the most favourable for flowers, except on the Nullabor Plain, 300 miles from Ooldea to Nareetha, I was within sight of flowering shrubs nearly all the time. The difficulties of botanizing, or rather of identifying

plants and shrubs when travelling at thirty miles an hour and over, through unfamiliar country, are considerable, more especially as at least a chain on either side of the track has been cleared absolutely of every sign of vegetation, probably on account of the risk of fire. By a chance stoppage of the train for some slight defect of the engine some twenty miles beyond Tarcoola I was able to pick my first flowers—a low-growing White Everlasting, probably *Helipterum floribundum* of our Wimmera and North-Western Plains, as these were growing close to the line. At about 280 miles I saw a scarlet patch on the ground near the edge of the cleared space, which I put down as being Sturt's Desert Pea, and, though I could not pick it up on my return, when at Tarcoola a resident presented the passengers with bunches of the finest flowers of that plant I had ever seen, grown in her garden, I am pretty sure my surmise was right. Some of these I exhibited at the recent wild-flower exhibition, but they had by that time (nine days later) almost lost their beauty. My next identification was a quondong tree bearing fruit. Many other shrubs were in bloom, some of which I took to be Acacias, but later, at Barton, I found I had, owing to the distance, been mistaking a Cassia for an Acacia. Of course, all the trees of any size near the line had long ago been used up by the construction parties for huts and firewood, so that those remaining were very poor specimens of gums, black-oke, and myall. A shrub with red flowers was never near enough for me to make even a guess at. It was probably a Templetonia.

About 100 miles beyond Tarcoola we ran into sand-hill country, and at 10.30 a.m. pulled up at Barton, for the east-bound train to pass. This, we learned, would be an hour late, consequently I was able to examine some of the shrubs, &c., near the line, finding several Acacias, a Cassia, quondongs, and many others strange to me. Continuing on among sand-hills, several unfamiliar shrubs were seen. About 2 p.m. we left the sand-hill country and entered on the straight run of 300 miles across the Nullabor Plain—"Nullabor" meaning "no trees." This is often called desert, but it is not so. The plain is covered with low saltbush, with here and there a taller bush; limestone outcrops alongside the track, and requires little excavating for use as ballast. About 8.30 p.m., near Deakin, we entered Western Australia, and when we looked out next morning found we had left the Nullabor Plain behind and had reached Zanthus (921 miles), the most interesting locality we had yet seen. Shrubs of many kinds were plentiful, several being in flower, while here and there were salmon gums and gimlet-wood—the latter a gum with very twisted grain, hence its name. The timber lasts for some miles, then, as

Kalgoorlie is approached, bare plains appear again—whether naturally so or whether the timber has been used for firewood in Kalgoorlie I cannot say, for timber trams run out for fifty or more miles all round that centre. Just before reaching Kalgoorlie the dump-heaps of the mines along the famous "Golden Mile" and a few distant hills are seen. The west-bound passengers generally have about five hours to spend here. Considering that Kalgoorlie is little more than twenty years old, its appearance is wonderful. Fine buildings, trams, electric light, &c., all created by gold and water, for without the latter (provided by the great Mundaring scheme) it would have been impossible to win the former. Like all other mining centres, Kalgoorlie is feeling the effects of worked-out mines, and considerable anxiety about the future is being manifested by those who have made the town their home. A wild-flower excursion train was announced for Menzies, 80 miles to the north, for the following day (Sunday); but, as I was expected by friends in Perth on that day, I had to forego seeing the famous everlasting-covered plains of the Central West.

My description of the country passed through has been very brief. Those who are interested should obtain one of the illustrated folders issued by the Commonwealth Railways from the Tourist Bureau. Further interesting details will be found in a little journal, *The Inlander*, issued by the Home Mission Board of the Presbyterian Church of Australia, dealing with problems of life on Australia's frontiers. In the number for February, 1918, the editor, Rev. John Flynn, in a well-illustrated article entitled "Spanning the Continent," gives a graphic description of the trials and difficulties of laying down the line in such inhospitable country; while in the *Emu* for January last (vol. xviii., part 3) Captain S. A. White, C.M.B.O.U., gives some account of four ornithological trips to the Nullabor Plains. This article also is illustrated, and from it one can get an idea of the natural history of this previously almost unvisited region. His illustration of the Ooldea Native Well is particularly characteristic of the area. *The Golden West*, an annual published in Perth, for December, 1917, contains further illustrations descriptive of scenes along the line.

About 6.30 p.m. I was once more on the train, bound for Perth. Of course, nothing could be seen of the country till next morning, when at Meenaar, 82 miles from Perth, flowering shrubs—I think Hakeas—were seen near the railway enclosure; but it was not till near Northam that really normal country—trees, hills, and streams—were seen. The Avon here being the first stream since crossing the Para, in South Australia. The green grass-covered hills, with the river meandering

between, were indeed a welcome sight. Soon I began to see flowers along the line. One, a curious rusty-coloured spike, I could not make out; then it suddenly dawned on me—my first Kangaroo Paw! And so it was—*Anigozanthos rufa*, called "Wallaby Paw" on account of its smaller size. As we climbed the Darling Range the timber improved, and more flowers appeared, among them the beautiful Leschenaultia, patches of brilliant sky-blue, which simply captured me, and I longed to be able to pick some. Nearing Swan View, the hillsides were covered with masses of a small acacia in full bloom, of a brilliant yellow. Many other flowers of various hues appeared as we passed down the western front of the range towards Midland Junction. Here the country changes, and you get on to the sandy, slightly undulating plain on which Perth is built. My attention was soon attracted by the numerous Zamias along the railway enclosure—a group of plants quite absent from Victoria. Then in a garden I caught a glimpse of a coral-tree in bloom.

Friends met me at Perth, and in the afternoon introduced me to Perth's greatest glories—the King's Park and the view of Swan River. The latter, let me tell you, is rather an estuary than a river, for, except during flood-time, there is probably little current in the water near Perth except that created by the tide. Of King's Park I cannot say enough; I approached it *via* Harvest Terrace, in which is situated the Parliament House, in the grounds of which I saw fine bushes of the Geraldton Wax-flower in full bloom. This charming shrub, allied to our Leptospermum, is grown in many gardens about Perth; in one I saw it used as a hedge plant. It is not found wild about Perth, being a native of the drier districts further north. Harvest Terrace is lined with fine trees of *Erythrina indica*, known as the Coral-tree; at that time they were bare of leaves, but bearing clusters of large, crimson, pea-shaped flowers. Towards the end of my stay the leaves were appearing and the flowers disappearing. In the Observatory grounds, close at hand, was a mass of native vegetation. On entering King's Park one's attention is soon centred on the fine drives bordered with *Eucalyptus ficifolia*, which, at their flowering time in December and January, bear masses of pink, orange, or scarlet flowers. Unfortunately for me, only an odd flower or two appeared before I left for home. Then came the view down on to the Swan, 200 feet below, with South Perth and its acres of bush land in the distance. A few yards further on my friends introduced me to the Kangaroo Paws, growing in the uncultivated centre of the park—some 800 acres—and with them many other flowers whose relationship I was able to guess at from their likeness to familiar

Victorian forms. A dwarf myrtaceous shrub, *Hypocalymma robusta*, quickly took my fancy on account of its double peach-coloured blossoms; hence it is generally known as "Peach Blossom." A Sowerbæa, a purple liliaceous plant, after the style of our Burchardia, was also prominent. Then there was our friend *Kennedya prostrata*, but apparently larger than we usually find it, and numerous other pea-flowers. The Kangaroo Paws were in hundreds, and just at their best. The picking of wild-flowers in the park is strictly forbidden, and if detected is followed by heavy fine, so that all who desire can feast their eyes on Nature's handiwork almost within a mile of the centre of the city. Many other strange and beautiful flowers were here, but where were the Epacris and Correa which one would expect to find associated with such heath-loving plants? On looking up my lists afterwards I found both these genera are absent from Western Australia.

We then followed the shore of Melville Water (as the expanded Swan is there called) to Nedlands, and took another tram, passing through a lot of bush country near Karrakatta back to Perth. I made up my mind then to try and get some flowers for the September meeting of the Club, and was advised to try the South-Western (Bunbury) line, between Gosnells and Kelmscott, about 15 miles from Perth. There I went on the following Tuesday, and, keeping within the railway enclosure, was soon bewildered with the many beautiful flowers met with. I did not go to Western Australia to collect, so have nothing to show you to-night; besides which, Mr. Topp has told you better than I can the characteristics of the flora prevailing in the south-western portion of Western Australia. In the moist places along the line were splendid Droseras up to three and four feet high, with a greater variety of colouring than we are accustomed to, a magenta Utricularia, and quantities of Leschenaultia of that delightful sky-blue colour of which one never seems to weary. Then I came upon the green Kangaroo Paws, *Anigozanthos viridis*, and got a fine bunch of them, but there were very few *A. Manglesii*, the crimson and green species. Asking a resident where to get them, I was directed to a drier part of the enclosure, towards Armadale, and in about a mile came upon them in all their glory. It was a great sensation to pick such a striking flower *ad libitum* for the first time. I soon had a nice bunch, and, getting a box at the local store, posted them at once to our secretary, thinking that, as the parcel should arrive in Melbourne on the following Sunday, they would be in time for Monday night's meeting; but as such promptitude in delivery might have established an awkward precedent for the post-office, they were not delivered to our secretary till the Tuesday,

so missed the meeting, and decorated his home instead. I understand they arrived in very good order.

Next day a friend gave up the day to introduce me to the Kalamunda railway line, and I would advise any flower-lover visiting Western Australia in August or September to take one or more trips up this line. I took only two, because I had not time for more. The line leaves the main line at Midland Junction and strikes south-east for the Darling Range, up which it climbs by means of a zig-zag like that formerly in use near Lithgow, in the Blue Mountains of New South Wales. The line was bordered with flowers on either side for miles. Soon after leaving Midland the rusty Kangaroo Paw appears, then *Manglesii*, with a few *viridis*; then *Kennedya coccinea* climbing over the smaller shrubs and gum saplings, converting them into pillars of brick-red flowers. It is an extremely pretty creeper, and I am glad that plants are now growing in our Botanical Gardens. Then fine patches of Leschenaultia, some of deeper blue than others; then the Smoke-bush, Conospermum (?), a white, woolly flower, appearing in the distance like so much smoke; and lots of others which I regret I cannot exhibit or tell you the names of. We left the train at Kalamunda (20 miles, and 920 feet above sea-level) and started off through the bush down the range to Midland, a distance of some twelve miles. The country was very rough, granite outcropping over a large portion of it, but the excitement of seeing so many unfamiliar flowers made me forget the roughness of the travelling. I cannot remember now all we saw. Almost our only orchid was *Caladenia flava*, resembling our *C. latifolia*, but of a beautiful lemon colour. I was disappointed in not seeing more acacias around Perth; perhaps I was too late for them, but as Western Australia is such a stronghold of the genus (140 in the extra-tropical portion), it must be that I did not strike their habitats. We saw one that day with extensive flanges to the stems and branches. Two or three Grevilleas were met with, and a part of the track bordered with an allied genus, Petrophila, was very fine, while *Kennedya coccinea* was everywhere, so that I returned to town with a nice collection. A large proportion of the plants met with were of a very woody type, and consequently a collector would have considerable trouble in making herbarium specimens of them.

My next excursion was a run by railway to Fremantle. Two plants excited my attention here. The blue Lupin of our gardens grew in many places along the line, and was flowering freely, while the display made by the introduced Cape-weed, *Calostemma calendulacea*, exceeded anything I had seen before. Perhaps the underlying limestone of the land

about Cottesloe suits it. However, the flowers were larger and of a deeper yellow than I had seen elsewhere, and one person said it was quite as fine a sight as the everlastings are at the goldfields.

For the Saturday, a friend of Miss Fuller's, to whom she had written of my coming, kindly invited me to join a few kindred spirits in an outing to Darlington, another locality in the Darling Range. Unfortunately, the day turned out showery, but I collected and saw enough to be able to say to a prospective visitor to Western Australia, "Don't miss Darlington." The Leschenaultia here was wonderful in numbers. Western Australia boasts of many Stylidiums (Trigger-plants); here they were in numbers and of the most curious and quaint designs.

The next day other friends took me a little further along the same line to the Mundaring Weir, one of the show places of the State. The line, originally built for the timber traffic, traverses a portion of the Darling Range which had been well timbered, but the best has long been cut out. One of the stations, Mahogany Creek, is the only place that I know of where the word "Creek" forms portion of the name of a locality, the words used in Western Australia being "Brook" or "Well"; hence Chidlow's Well, a few miles beyond. The weir is on a branch line having a drop of 450 feet in five miles, and perhaps a few words about it and the reason for its existence may be of interest. Earlier in the paper I spoke of Kalgoorlie and its mines. Well, early in the existence of the Coolgardie goldfield, of which Kalgoorlie is part, it was seen that without water the mines could not exist, as the rainfall (10″), combined with an evaporation of from six to eight feet annually, was too small to provide for local conservation. The nearest permanent water was in the Darling Range, 350 miles away, but the Coolgardie table-land was 1,400 feet above sea-level, while the Helena River, which seemed the most likely to provide a regular supply of water, was less than 500 feet above sea-level. The problem was faced by the late Mr. C. Y. O'Connor, Engineer-in-Chief of the State, who decided that it could be solved by a huge pumping scheme. This was much ridiculed, but the late Sir John Forrest, knowing from his experiences as an explorer that water was everything in a case like this, backed him up, and, being Premier at the time, persuaded Parliament to adopt the proposal. The weir is 100 feet in height, and closes a picturesque gorge, somewhat resembling the Yarra at Studley Park, and backs up the water for about seven miles. The reservoir can contain about 4,600 millions of gallons of water; of this, about $3\frac{1}{2}$ million gallons, weighing about 15,000 tons, are

pumped every day and sent on the long journey to Kalgoorlie, taking about four weeks to accomplish the distance of 350 miles. For this task there are eight pumping stations, situated about fifty miles apart. The main is of the lock-bar type, and can be seen at many places along the line between Northam and Coolgardie. The neighbourhood of the weir is also a good collecting-ground. A beautiful Hovea was in full bloom when I was there, and a Hibiscus was another conspicuous shrub.

A few words about the Darling Range, which has such an influence upon the vegetation of the Perth district, may help to a better understanding of this peculiar feature of Western Australia. Standing in King's Park and looking east, one can see the range extending for miles from north to south, occupying about the same position as the Dandenongs do to Melbourne. It extends for more than 200 miles, from about Moora, 110 miles north of Perth, almost to Cape Leeuwin, the south-western extremity of the State; but it is not by any means a dividing range such as that traversing Victoria, for it is broken by valleys through which streams find their way from its eastern slopes to the Indian Ocean. Thus the Swan, known in its upper portion as the Avon, rises far to the east of its main ridge and flows into the ocean some thirty miles west of its face. Geologists tell us that the face of the Darling Range presented to Perth is a fault scarp, and that the twenty miles or so of country lying between it and the seaboard consist of recent dune rock overlying Cretaceous and Permo-Carboniferous strata. This stretch of sandy country is apparently saturated with water, and capillary attraction is perhaps accountable for the wealth of vegetation supported in what looks like a dry and unpromising region. That the depth of sand is immense was proved when the bore at the Zoological Gardens, used to supply warm baths, was put down through 1,500 feet of pure sand. Fremantle and some of the other suburbs depend for their water supply on artesian bores. The range consists of granites of several types, but does not rise to any great height, Mount William, about 1,600 feet, near Hamel, being its highest point. We have in the Brisbane Range, to the south of Bacchus Marsh, a very similar geological feature, but on a much smaller scale.

To a visitor from Melbourne interested in geology the surroundings of Perth present little opportunity for the study, the absence of our familiar Silurian and Basaltic formations being at once apparent, the only rocks near Perth being the granite of the Darling Range and a soft limestone between Cottesloe and Fremantle; this is used both for building and road metal, hardening considerably on exposure to the air. For basalt one has to go to Bunbury, 120 miles south, where there is an

exposure close to the sea, while there are few other occurrences in the State.

Western Australia is a State of great distances between important places. A visitor must thus have plenty of time at his disposal if he wishes to see all types of country. Kalgoorlie is about the same distance from Perth as Mildura is from Melbourne, while Day Dawn and Laverton, two other important mining localities, are 525 and 586 miles respectively, the latter being just the same distance as between Melbourne and Sydney. Albany is 340 miles away, almost as far as Mildura, while Katanning, the centre of the agricultural area, is 225 miles, or about as far away as Orbost. For timber one must go south to Karridale, 170 miles—nearly as far as Albury. Geraldton, the home of the Wax-flower and Sturt's Desert Pea, is 300 miles north of Perth, and bear in mind that each of the places mentioned is in a different direction.

As I wanted to see a little more than the immediate surroundings of Perth, I decided to pay a visit to the Yallingup Cave, situated about thirty miles from Busselton, a journey altogether of some 170 miles. Busselton is the terminus of the South-Western line, which also serves Bunbury, several timber lines into the Darling Range, the Collie coal-field, and the sandstone deposit near Donnybrook. The line traverses that twenty-mile strip of sandy country between the Darling Range and the sea, sometimes approaching the range fairly close. I hoped to see some of the famous timber of the South-West, but found that to do so I should have made a trip along one of the branch lines mentioned. At Busselton tourists are met by the Caves motor and conveyed to their destination. The greater part of the road is close to the sea, and passes through a natural avenue of the Weeping Agonis, *Agonis flexuosa*, usually called "Peppermint" in the West. This district is its stronghold, and it certainly is a distinctive feature. Many of the trees were 25 feet in height, with stem diameters of 18 inches or more. Its drooping character gave a particularly pleasant effect to the drive. As we ascended the ridge forming Cape Naturaliste grass-trees and Zamias became more prominent. The country along the line from Perth reminds one very much of the Frankston country. Several good rivers—the Canning, the Murray, the Brunswick, and the Collie—were crossed. Near the Bunbury junction Kangaroo Paws occurred in hundreds, and were a splendid sight. The Cave House at Yallingup is within sight and sound of the Indian Ocean. The fifty miles of limestone country between Capes Naturaliste and Leeuwin are honeycombed with caves, the best being those at the Margaret River, about thirty miles south of Yallingup. I arranged to go on there, and started by motor on a lovely

morning with anticipations of a delightful trip, but disappointment soon came. After travelling about twenty miles through timber country — jarrah and karri principally — improving at every mile, at mid-day the motor struck, and nothing would induce it to move again. With miles to the nearest house, there was nothing to be done but admire the wild-flowers till help came. Just at dusk our chauffeur returned with a farmer's waggon and pair, and we made a start for home, which was safely reached about 9 p.m. So ended my visit to the Margaret River Caves; but during my enforced stay I walked on a couple of miles or so and saw many interesting plants, especially a Hovea, a shrub of four feet or so, bearing flowers of the deepest purple—in some cases so abundant as to quite hide the stems and leaves. It was worth while to be able to see it so closely and pick it, which I could not have done had I motored past at twenty miles an hour. Then there were two or three species of Anigozanthos (Kangaroo Paws), with smaller flowers and of a tall, branching habit; one of these was flowering in our Botanical Gardens last month. During my rambles around the Cave House I met with several interesting plants—a pink Pimelea growing almost within reach of the breakers; a Thomasia (Sterculiaceæ) very like one I had seen at Wilson's Promontory, the eastern limit of the genus. A fine leguminaceous flower was *Templetonia retusa*, with crimson flowers an inch or more in length. I was charmed with a very beautiful climber growing sparingly in the scrub near the entrance to the Yallingup Cave, which may have been another Kennedya. It would be an acquisition to any garden. Among the rocks here was a fern closely resembling *Lindsaya linearis*, of which I brought home plants. The list of Western Australian ferns is very meagre—only fifteen or sixteen species, only two of which are not found in Victoria. The paucity of ferns is rather remarkable, for there are many localities in the south-west where one would expect ferns to do well.

The Yallingup Cave is entered from a sort of natural shaft on the side of a hill not far from Cave House, and, like most limestone caves, contains a number of beautiful formations bearing names more or less appropriate. At Yallingup the formations are remarkable for their very fine colourings. This is well exemplified in the "Arab's Tent"; but perhaps the most noticeable formation of all is that called the "Folded Shawl." This has been selected by Mr. E. J. Brady for illustration in his great work, "Australia Unlimited." The shawl formations here are said to be the finest in Australia, and why the "Folded Shawl" took its present shape is a mystery. There are about a mile of galleries, stairways, &c., lighted by electricity. The two hours we spent there went all too quickly,

and whetted our appetities for the further beauties we were to see in the Margaret River Caves, which are considered much finer.

Some misconception seems to exist in the minds of Victorians, who are used to big trees, as to the size of the Jarrah and Karri, two of the principal timber trees of the West, which are very restricted in their distribution. Quoting from the late Mr. J. Ednie Brown's report as Conservator of Forests (Western Australian Year-Book, 1900), he says :—" Considerable areas of Jarrah (*Eucalyptus marginata*) forest exist in which many of the trees attain heights of 90 to 120 feet, with good stems 3 to 5 feet in diameter, and 50 or 60 feet to the first branch, but the average size of a good healthy tree would be 90 to 100 feet in height and $2\frac{1}{2}$ to $3\frac{1}{2}$ feet in diameter at the base." Regarding Karri, *E. diversicolor*, he says :—" In its young state it is a very ornamental tree. When mature an average tree may be put down at 200 feet in height, 4 feet in diameter at 3 to 4 feet from the ground, and 120 to 150 feet to the first branch." The finest tree he knew of was 11 feet in circumference at 3 feet from the ground and 160 feet to the first branch, where it was 56 inches in diameter.

Two other excursions near Perth may be worth mentioning. One was to Kelmscott and then up the road to Martin's Hill. This put me very much in mind of the ascent of Mount Dandenong from Croydon. Many Victorian genera occurred along the road, such as Stackhousia, Daviesia, Pultenæa. A very fine Grevillea grew abundantly on the top of the hill. The track in many places was over ironstone gravel, which was remarkably heavy, and seemed to contain enough mineral to be of economic value, but on account of the expense iron ore has to be very pure to be worth treatment. In a fruit garden adjacent bananas seemed to be doing very well. This reminds me that the plantain is very common in gardens around Perth, and bears fruit. Another very common tree is a castor oil-tree, but whether the species which supplies the oil of commerce I cannot say. If it is, then an effort should be made to utilize it, for castor oil is in great demand at present as a lubricant. At Kelmscott I saw the Crimson Kangaroo Paws used with good effect as a border to a drive, having somewhat the appearance that clumps of gladioli would have.

The final outing of my trip was another visit to the zig-zag on the Kalamunda line. I slipped out of the train at the summit of the zig-zag (700 feet) and walked back to Midland Junction, collecting flowers nearly all the way. Just at my starting-point were hundreds of the charming *Helipterum* (*Rhodanthe*) *Manglesii*, their pink flowers lasting for a long time as a table decoration. Many other flowers occurred all

along the line as I descended, of which I am unable to give the names. I noticed here, as also in the open scrub land about Victoria Park, a southern suburb, quantities of *Calectasia cyanea*, the Tinsel Lily of our Grampians. The Western Wattle, *Acacia saligna*, was very fine about Applecross, where also that remarkable tree, *Nuytsia floribunda*, known as the Christmas-tree (on account of its being covered with gorgeous orange blossoms about Christmas time) also grows, but I did not come across a specimen. There was also a brilliantly-coloured Banksia. Another good place for flowers was the open land close to the tram terminus at Mount Lawley, a northern suburb. Two other places I wanted to visit but could not, on account of the infrequency of the trains, were the Serpentine Falls, beyond Armadale, and Gingin (50 miles), on the Northern (Geraldton) railway, where I would have seen a different class of country. Swan View (Darling Range) is also a good wild-flower locality, but had to be omitted from my itinerary.

A couple of days before I left Perth a wild-flower show for patriotic purposes was held in the Town Hall. Of course, I paid it a visit, but was somewhat disappointed. There were certainly quantities of Kangaroo Paws, Boronia (from Albany), Geraldton Wax-flowers, &c., for sale, but little attempt at a botanical display; however, I saw many flowers which I had not met with in my short rambles, such as the red Leschenaultia (which, I believe, is somewhat rare), the Verticordias, and quite a number of orchids, including the Porcelain Orchid, of which we had specimens at our recent display.

It is possible that some of my listeners have been disappointed in the fact that I did not enter into greater detail than I have done regarding the flora of that part of Western Australia which I visited, but it must be borne in mind that I was a stranger in a strange land, and my visit was far too short in which to gather much detail of such a large subject; and besides, Mr. Topp, in his paper previously referred to, has made so many comparisons between south-western and south-eastern plants that further detail is unnecessary now. For those who contemplate a visit thither I would suggest a study of the articles on the natural history of the State which have appeared in the Year-Book published by the State Government, particularly those in vols. ix.–xiii. (1894–1902). A useful article on the flora, by Mr. J. J. East, with references to previous writers on the subject, was published in the "Cyclopædia of Western Australia," 1912; while the handbook published for use of the British Association meeting in 1914, together with the articles by Mr. J. H. Maiden, I.S.O., F.R.S., in the Federal handbook for the same meeting, contain a vast

amount of information not readily procurable elsewhere. Up to the present no work dealing exclusively with the botany of Western Australia has been published, but I have been informed that Mr. Oswald Sargent, of York, is collecting material for such a publication, which will no doubt be greatly appreciated, for, as Mr. Maiden says regarding Western Australia, " its pre-eminence as a botanist's paradise is without question."

The natural history of Western Australia has attracted the attention of naturalists for more than two hundred years, for had not Vlaming in 1696 visited the Swan River and captured there actual specimens of the fabulous Black Swan of Juvenal, and managed to take three of them alive to Batavia. Three years later William Dampier visited Western Australia for the second time, and, landing at Shark Bay, was disappointed with the barren appearance of the country. He referred to the kangaroo as " a strange creature like a raccoon, which used only its hind legs, and, instead of walking, advanced by great bounds or leaps of twelve or fifteen feet at a time." In 1791 Archibald Menzies, naturalist to Vancouver's expedition, spent some time at King George's Sound making extensive botanical collections. In the following year Mons. Labillardière, naturalist to the French expedition under D'Entrecasteaux, visited the south-western coast, while in 1801 came Matthew Flinders in the *Investigator*, and with him was Robert Brown, the father of Australian botany, who made rich hauls in the neighbourhood of King George's Sound. In 1801–2 another French expedition under Baudin searched the west coast for traces of La Perouse, without success. The botanist to this expedition was Mons. Leschenault, after whom that beautiful member of the Goodeniaceæ was named, and which, so far as I could learn, bears no vernacular name, being always referred to by its scientific appellation.

After my all too short acquaintance with the Swan River flora, I could quite understand the pleasure and curiosity with which early botanical explorers must have wandered about the sandy surroundings of the Swan River and secured for friends in England and elsewhere specimens of its wonderful flora. Probably the man who did most to make Western Australian plants known to the world was James Drummond, who arrived in Western Australia as " agriculturist " with the first Governor, Capt. Stirling, 1829, and was placed in charge of a garden for introducing useful plants into the colony. He devoted a considerable portion of his time to collecting native plants and forwarding specimen plants and seeds to England, where they became quite a rage, and for years New Holland plants, as they were termed, were grown in glass-houses by

wealthy folks. His name has been used as a specific name for some hundreds of Western Australian plants. Another man who spread the fame of New Holland plants was John Lindley, who was Professor of Botany in the University of London in 1829. In 1839 he published in Edwards's "Botanical Register," vol. xxxii., "A Sketch of the Vegetation of the Swan River Colony." This contains coloured figures of eighteen species. A copy can be seen in our Melbourne Public Library, and the faithfulness of the figures remarked. Our own grand old man, the late Baron von Mueller, did a great deal towards the elucidation of the Western Australian flora, and, I believe, showed considerable partiality towards it, which perhaps may be accounted for by the fact that in 1856 he accompanied, as botanist, the A. C. Gregory Exploring Expedition in North-Western and Northern Australia, and in 1867 and 1877 made visits to Western Australia for purposes of botanical research. In this connection it may be mentioned that a society for the study of the native flora—the Mueller Botanic Society—was founded in Perth in 1897, which published eleven parts of its proceedings, dated September, 1899–April, 1903. In April, 1903, it became the Western Australian Natural History Society, publishing proceedings at irregular intervals. On 17th August, 1909, the title of the society was altered to Natural History and Science Society of Western Australia, and it commenced the publication of a quarterly journal. In 1914 the society became the Royal Society of Western Australia. Unfortunately, the set of the society's proceedings in our library is far from complete, but it contains many useful articles. Probably in the early days of the society, a piece of land lying between Leederville and Subiaco, two of the western suburbs of Perth, was dedicated as a public park, under the name of Mueller Park ; but as one of the far-reaching effects of the late war I found that this is now shown on the official plan of Perth (October, 1917) as Kitchener Park, the name "Mueller" having been discarded, probably on account of its German flavour.

These notes will hardly be complete without some reference to the Western Australian Museum, which is housed in a fine building a little to the north of the railway station and overlooking Central Perth. It was opened on its present site in 1891, and contains a creditable lot of specimens. Western Australian birds are well represented, but I was very much struck, while glancing at them, with the prevalence of sombre tints in their colourings, even the parrots making a poor show. This, probably, is an indication of the type of country which they inhabit. Among a number of interesting large cases was one containing a group of the common sea and shore birds found

near Perth. The authorities are proud of their mounted whale skeleton, 80 feet long. Fossils, minerals, and the other items of a museum make up a very interesting collection. The ethnological display was not so extensive as I had expected from such a large area as Western Australia, still having a large aboriginal population; but I learned that from want of room many valuable exhibits are unable to be displayed. The Public Library occupies portion of the same building, and the Royal Society has the use of a room there. The monthly meeting of the society took place while I was on my Caves trip, so I unfortunately missed meeting some of the kindred spirits of the West. The Zoological Gardens at South Perth were not seen at their best. The dry season was affecting them, and during the previous winter there had been numerous deaths among the animals and birds; but more serious than all was the falling-off in revenue, and consequently the difficulty of upkeep. This, unfortunately, is the result of a universal monetary depression in Western Australia, of which we have seen evidences in the papers during the past week, mainly due to the falling-off of the gold yield and the agricultural and other industries not being sufficient to fill its place. Perhaps as shipping gets more plentiful there will be a greater inducement to turn to the land, for from the land can be the only certain income.

Western Australia occupies about one-third of the island continent of Australia, and it should be borne in mind that my remarks have referred only to a few localities in that part of the State which, partly for the sake of brevity and partly to revive its first designation, Dr. Griffith Taylor has aptly termed "Swanland" in his exceedingly interesting memoir on "The Australian Environment." Swanland is also a set-off to Gippsland, in the south-eastern corner of the continent, and saves the use of that longer designation, "South-Western Western Australia," which was previously necessary. His eastern boundary of Swanland, which is practically the 10″ rainfall line, runs from Shark Bay in the north to Israelite Bay in the south-east, crossing the Eastern railway between Southern Cross and Coolgardie, and the Coolgardie–Norseman line about midway between those two places.

On my return to Adelaide I broke my journey for three days, and filled in my time with friends and by taking two of the Tourist Bureau char-a-banc trips, which are very popular. The first was through Magill and up the road to Norton's Summit, past the Morialta Falls—a spot that is worth anyone's while to visit. The falls are in a magnificent gorge after the character of the Werribee Gorge, and are visible from the road. Then on through Piccadilly to Crafers; here there was

a stoppage of half an hour for afternoon tea. In chatting with a lady and gentleman on the car they said "they would like to take some of the wild-flowers home to their daughter, who belonged to a naturalists' club." I naturally was inquisitive enough to ask, "What club?" when I was informed "The Melbourne one." "Well," I said, "I probably know your daughter, and she is sure to have spoken of me," so I introduced myself. The member referred to is Miss M. Johnson, Miss G. Nethercote's companion on her Baw Baw trip. On leaving Crafers we went up to the summit of Mount Lofty, from whence there is a fine view of the Adelaide plain, and then took the road down to Adelaide through the Glen Osmond valley. A beautiful trip, but the hills were very dry, and few flowers were to be seen, *Pultenæa daphnoides* being the most noticeable. The war has even affected the vegetation of these hills, for, owing to the scarcity of shipping, the Broken Hill mines have not been able to get their regular supplies of Oregon timber from America, so they have had to fall back on local timber, and, as South Australia is very short of forest timber, the Mount Lofty Ranges are being stripped of their gums, and the logs sent to Broken Hill. The face of the range is also being deeply scarred by the extension of the quarries which supply the stone for building and road-making purposes in the city and suburbs. These scars can be seen from a distance of six or eight miles, so they are fairly extensive. The second trip, on the next afternoon, in which Mr. and Mrs. Johnson also joined, was southerly *via* Happy Valley Reservoir to Clarendon, on the Onkaparinga River, returning to Adelaide by the Coromandel Valley and Blackwood—another very picturesque trip, and, had the country not been so dry, would have been more enjoyable. No visitor to Adelaide should fail to take one or more of the Tourist Bureau trips. Most of them touch the Mount Lofty Ranges in one part or another.

My final day was terribly windy and dusty. I visited the Zoo in the morning. The collection of animals and birds is more modest than ours, but everything is very nicely housed and well kept. While there I noticed two or three specimens of the Larger Wanderer Butterfly lazily flying about. All too short visits to the Botanical Gardens, South Australian Museum, and the Public Library filled up a busy day, and left one wishing for a few more days in "The City of the Plain." The ethnological exhibits at the museum are very extensive and particularly interesting, and deserved a much longer time than I had to spare for them. My holiday was nearly over, and I returned to Melbourne next (the thirtieth) day, well pleased with the experiences of my trip, for is not all travel educative.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The thirty-ninth annual meeting was held at the Royal Society's Hall on Monday evening, 16th June, 1919.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about 120 members and visitors were present.

CORRESPONDENCE.

From Mr. W. H. D. Le Souëf, C.M.Z.S., thanking the members for their expression of sympathy in his recent assault by footpads, and stating that he was almost himself again.

REPORTS.

A report of the excursion to Studley Park on Saturday, 17th May, was given by the leader, Mr. A. D. Hardy, who briefly outlined the extent of the ramble and the objects noted, pointing out what a valuable asset Studley Park is, both for the study of botany, in the shape of metropolitan representatives of some of our forest trees, and for the study of sedimentary rocks. He said that the party, which was a large one, had been kindly invited to afternoon tea by Mr. and Mrs. J. Gabriel, whose residence adjoins the park.

On the motion of Messrs. Barnard and Cox, a hearty vote of thanks was passed to Mr. and Mrs. Gabriel for their hospitality.

A brief report of the visit to the Geological Museum on Saturday, 31st May, was given by Mr. F. G. A. Barnard, who said that there had been a good attendance of members. Mr. R. A. Keble, who was the guide for the afternoon, devoted some time to the mode of occurrence in Victoria of some of the rare minerals, such as wolfram and molybdenum, and pointed out specimens of the different ores. He then dealt with various other economic mineral productions of Victoria, according to their geological age, and made the visitor realize what a wealth of information can be derived from the examination of the specimens in the museum.

A report of the excursion from Evelyn to Montrose, on Monday, 9th June (King's Birthday), was given by the leader, Mr. G. Coghill, who said that there had been a good muster of members, but, unfortunately, the day turned out most unpleasant—at first very windy, afterwards smart showers. From a botanical point of view the excursion had not been the success that he had hoped, for, where the previous season the native heath, *Epacris impressa*, had been in abundance, on this occasion

it was very poor, partly owing to fires during the summer, and partly to the extraordinary autumn just experienced, when both native plants and introduced trees, &c., apparently misjudged the season, and flowered at a time when they should have been resting. He remarked that along part of the route followed, the bank of the Lilydale water-race, numerous seedlings of about a dozen species of ferns were easily obtainable. They were just the size for moving, and their removal was in no way detrimental, for at intervals the race was cleaned out, and most of the young ferns were destroyed. Luncheon was taken at his week-end cottage, where the party arrived just in time to avoid a wetting. During the afternoon a visit was paid to the neighbouring Olinda Reservoir, but the fine view usually obtainable from that elevated spot was marred by rain clouds. The members of the party, however, seemed to enjoy the outing, and returned to Mooroolbark station laden with heath and gum leaves for home decoration.

Mr. J. L. Robertson said that he had brought the excursion under the notice of the officers of H.M.S. *New Zealand*, but he supposed their official duties could not be set aside, for no one responded to the invitation.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. W. H. Ingram, "Swainton," Clowes-street, South Yarra, was duly elected an ordinary member; Mrs. J. Findlay Fraser, Sunnyside, *via* Drouin, as a country member; and Miss Oonah Hardy, Studley-avenue, Kew, as an associate member of the Club.

ANNUAL REPORT.

The hon. secretary, Mr. E. S. Anthony, read the thirty-ninth annual report for the year 1918–19, which was as follows:—

"To the Members of the Field Naturalists' Club of Victoria.

"Ladies and Gentlemen,—In presenting the thirty-ninth annual report of the Club, your committee feel that it is a matter for great thankfulness that the year just closed has seen also the conclusion of the greatest conflict in human history. For over four years the nations of the world have been engaged in the deadliest strife, and it is little wonder that, amid the unprecedented events of this period, a Club such as ours should have been content with quiet, unostentatious work rather than with movements of an aggressive nature.

"In reviewing the past year, it is pleasing to record the loyal support your committee and officers have received from members despite the distracting factors alluded to.

"The Club year had a good send-off at the annual meeting. This usually formal business meeting was made attractive by the addition of a general exhibition of natural history specimens, to the success of which a large number of the members contributed. His Excellency the Governor-General, Sir Ronald Munro Ferguson, K.C.M.G., himself a member of the Club, attended the meeting, and, in addition to unveiling the honour board so generously donated by Messrs. J. Gabriel and P. R. H. St. John, made a close examination of the individual exhibits, and showed genuine interest in this demonstration of the Club's varied operations.

"Throughout the year, with the exception of the month of February, the monthly meetings have been held regularly, the one omission being due to the Board of Health's restrictions prohibiting public gatherings on account of the prevailing epidemic of influenza.

"These monthly meetings have maintained the standard so long upheld by the Club in regard to scientific interest, variety of subjects, and popular character. The attendances have averaged between 50 and 60 persons each month. It has always been considered of paramount importance to encourage members at these meetings to place on view specimens of interest, and there has been no lack of exhibits during the past year. Brief explanatory notes have greatly enhanced the value of this part of the programme. Lectures have been delivered and papers read dealing with botany, entomology, geology, meteorology, ornithology, and zoology. Several of these were illustrated by excellent lantern views and diagrams. The authors' names and titles of their lectures and papers are as follows:—Mr. J. Hatch, lecture (illustrated), 'The Bird-Life of Macquarie Island'; Dr. Griffith Taylor, B.E., B.A., F.G.S., lecture (illustrated), 'Science in Antarctica'; Mr. F. Chapman, A.L.S., lecture (illustrated), 'Geological History of Australian Plants: Mesozoic Flora.' Papers.—Mr. Thomas Steele, 'Tracks of the Garden Snail'; Mr. F. P. Dodd, 'An Entomologist's Trip to New Guinea'; Mr. F. E. Wilson, 'An Ornithologist's Notes in the Mallee'; Mr. J. W. Audas, F.L.S., 'Nature in the Serra Range'; Mr. J. Gabriel, 'Destruction of Mutton-Birds at Phillip Island'; Mr. F. G. A. Barnard, 'Notes on a Trip to Western Australia'; Mr. H. B. Williamson, 'Notes on the Census of the Victorian Flora'; Mr. A. H. S. Lucas, M.A., 'A Week Among the Seaweeds at Portsea'; Mr. J. Booth, M.C.E., B.Sc., 'About Pet Peter, a Flying Phalanger.' Your committee expresses its thanks to the contributors named.

"The Club excursions, always regarded as a special feature of its many activities, still continue their popularity. The

majority of these were half-day visits to localities easily accessible on the Saturday afternoon, but several whole-day outings further afield were also conducted, and a five days' visit to Marysville at Christmas time proved a very successful undertaking. The famous Grampians were visited in September by a party of Club members in conjunction with the excursion arranged by the Tourists' Bureau. The thanks of your committee are extended to those ladies and gentlemen who have acted as leaders and organizers of these field excursions.

"The annual wild-flower exhibition as a public show has become a regular institution. This year it was again held in the Melbourne Town Hall, and the proceeds devoted to the Soldiers' Fund of the Y.M.C.A. The hall was found none too large for the fine display of native flowers generously forwarded by members and friends from all the States of the Commonwealth. The microscopical display, which was a noteworthy feature of the show, was due to the generous assistance of the Microscopical Society and the painstaking labours of Mr. J. Searle. Many lady members and friends gave of their time and work unsparingly, and the ladies' committee, under the capable management of Miss A. Fuller, has your committee's congratulations. Many other workers, both before and at the show, are deserving of more than passing mention for their voluntary assistance in ways too numerous to refer to. The net result of this one-day exhibition was £141 2s. 9d., which must be considered satisfactory, especially having regard to the unpropitious weather.

"In addition to these more prominent operations of the Club, a number of other matters of not less importance have been dealt with.

"Strong support has been given to the department administering the *Fisheries and Game Act*, particularly in relation to the close season for quail and other game.

"In connection with the National Park, during the year the Government received applications to throw open this proclaimed sanctuary for the preservation of the native fauna and flora for purposes of tin mining. A large and influential deputation (on which this Club was strongly represented) waited on the Minister of Mines to oppose this application, and their efforts were partially successful. The Club's support was also requested by the naturalists of South Australia in their endeavours to secure a reserve for the protection of native fauna and flora in that State, and it is understood that the request is likely to receive favourable consideration.

"A good deal of publicity was given to Macquarie Island and the destruction of its bird-life during the period under review, and a representative was selected by this Club (and

afterwards approved of by the Tasmanian Government) to pay a visit of inspection and report to the Club. Owing to the lateness of the season, and other reasons, the visit of this representative was deferred for the time being.

"The Plant Names Committee still pursue their labours, and are at present dealing with the final revision of the vernacular names.

"The Club's monthly journal, the *Victorian Naturalist*, under the able editorship of Mr. F. G. A. Barnard, is a far greater asset to the Club than may be generally known. Besides recording the meetings and excursion reports, the lectures and papers read before the Club are published *in extenso*, and your committee are pleased to report that inquiries from the other States and overseas are frequently made for copies containing certain scientific matter regarded as important. Your committee desire to place on record their appreciation of the untiring devotion to duty of the honorary editor, who has not spared himself in bringing the *Naturalist* to the high standard it has now reached.

"Another officer who has served the Club voluntarily for many years, but who this year seeks retirement, is Mr. George Coghill. As hon. treasurer for 15 years or more, he has controlled the finances of the Club in a very capable manner. His business ability and systematic methods have assisted your committee in no small degree, and they much regret that he feels that he is unable to continue in the office.

"The hon. secretary (Mr. E. S. Anthony) finds it impossible to continue in office, and has reluctantly to retire this year also. To Mr. W. Glance, who has for some years acted as hon. assistant secretary and hon. assistant librarian, your committee express their thanks for his regular attention to the duties of these dual offices.

"Your committee are greatly indebted to Messrs. Coghill and Haughton for the continued free use of their office for the committee meetings each month. These central, well-lighted premises have been of great convenience to the committee.

"The library is still in the capable hands of Mr. P. R. H. St. John, and a recent list of publications regularly received into the library by purchase or exchange should be of advantage to members.

Membership.—The year commenced with a roll of 229 members, and at the close of the year the number was 233, showing an increase for the twelve months of 4, after allowing for resignations and elections. A list of the members was published in the last number of the *Naturalist* for the year (April, 1919).

"Your committee are pleased to welcome back those

members who have been on active service, and trust before very long that all those members who have been so engaged will be back to their homeland once again.

"To those of the members (and they are many) who have during the year been bereaved your committee tender sincerest sympathy.

"The finances of the Club are in a sound position, and, as indicated in the hon. treasurer's statement, despite the increased cost of paper, printing, and postages, there is a credit balance at the close of the year of £58 15s. 9d.

"In conclusion, your committee trust that, with the altered condition of national affairs, members will be enabled to devote their energies more whole-heartedly to the pursuit of natural history, and by so doing assist the incoming officers and committee to promote the best interests of the Field Naturalists' Club.

"On behalf of the Committee,

"A. D. HARDY, *President.*

"28th May, 1919." "E. S. ANTHONY, *Hon. Secretary.*

On the motion of Mr. E. Cox, seconded by Mr. P. R. H. St. John, the report was received and adopted.

FINANCIAL STATEMENT.

The hon. treasurer, Mr. G. Coghill, presented the financial statement for 1918–19, which was as follows:—

RECEIPTS.

To Balance, 30th April, 1918				£61 8 8
,, Subscriptions—				
Ordinary Members ...	£120 17 6			
Country Members ...	30 16 0			
Associate Members ...	3 12 6			
		£155 6 0*		
,, *Victorian Naturalist*—				
Subscriptions and Sales	8 1 1			
Advertisements ...	3 15 0			
Reprints	1 10 9			
		13 6 10		
,, Sales of Badges		0 8 0		
,, Special Subscriptions and Donations ...		1 10 0		
,, Interest, Savings Bank and War Loan ...		1 3 1		
,, Library—Overpaid on Periodicals ...		1 18 0		
				173 11 11
,, Wild-flower Exhibition—				
Admissions		126 0 6		
Sales		51 11 4		
Refreshments		4 18 11		
				182 10 9
				£417 11 4

*Subscriptions:—Arrears, £29 5s.; 1918–19, £121 15s.; 1919–20, £4 6s.—total £155 6s.

EXPENDITURE.

By *Victorian Naturalist*—								
Printing	£93	17	9					
Illustrating	4	19	6					
Free Reprints ...	7	0	0					
Reprints charged ...	0	11	0					
				£106	8	3		
,, *Victorian Naturalist*—								
Wrapping and Posting				15	7	3		
,, Rooms—Rent and Attendance ...				13	15	0		
,, Library—Books	2	12	6					
Periodicals	3	10	6					
Insurance	0	7	0					
				6	10	0		
,, Hire of Lantern				2	15	0		
,, Printing and Stationery				16	14	6		
,, Postages, &c.				8	4	4		
,, Subscriptions and Donations				6	10	6		
							176	4 10
,, Wild-flower Exhibition—								
Rent of Hall, &c.				20	1	0		
Expenses				21	7	0		
Cheque to Y.M.C.A. Fund				141	2	9		
							182	10 9
,, Balance in Savings Bank				51	3	1		
,, ,, London Bank				7	12	8		
							58	15 9
							£417	11 4

G. COGHILL, *Hon. Treasurer.*
15*th May*, 1919.

Audited and found correct.

F. WISEWOULD,
F. KEEP, } *Auditors.*
23*rd May*, 1919.

The following statement of assets and liabilities was also presented :—

ASSETS.

Balance—Savings Bank and London Bank	£58 15 9
War Loan Bond	20 0 0
Arrears of Subscriptions (£58), say...	40 0 0
Library and Furniture (Insurance Value)	150 0 0
	£268 15 9

LIABILITIES.

Subscriptions paid in advance	£4 6 0

On the motion of Mr. G. Coghill, seconded by Mr. P. R. H. St. John, the statement was received and adopted.

A vote of thanks to the officers for the past year was proposed by Mr. E. Cox and seconded by Mr. J. Stickland. The motion was supported by Mr. F. Keep and carried unanimously.

On the motion of Mr. F. G. A. Barnard, seconded by Mr. H. Whitmore, a special vote of thanks was accorded to Mr. G.

Coghill in recognition of his valuable services as hon. treasurer for the past 15 years.

ELECTION OF OFFICE-BEARERS, 1919–20.

The following office-bearers, being the only nominations received, were declared duly elected :—President, Mr. A. D. Hardy, F.L.S.; hon. treasurer, Mr. F. Pitcher; hon. librarian, Mr. P. R. H. St. John; hon. editor, Mr. F. G. A. Barnard; hon. secretary, Mr. P. C. Morrison; and hon. assistant secretary and librarian, Mr. W. Glance.

On a ballot being taken for two vice-presidents, Messrs. J. Gabriel and J. Searle were duly elected,

On a ballot being taken for five members of committee, Messrs. F. Chapman, A.L.S., G. Coghill, C. Daley, F.L.S., J. A. Kershaw, F.E.S., and Dr. C. S. Sutton were duly elected.

DEATH OF A LIFE MEMBER.

The president referred to the recent death, at the ripe age of 91, of Mr. B. R. Patey, one of the early members of the Club, who, in September, 1882, availed himself of a new rule then passed, and became the first life member of the Club. He, however, did not take a very active part in the work of the Club in the succeeding years, and therefore was unknown to most of the present members. It was resolved, on the motion of Messrs. F. Pitcher and C. French, to forward a letter of condolence to his relatives.

EXHIBITS.

With the view of making the annual meeting more than usually attractive, members had been requested to make a special display of interesting exhibits, and the response was seen in the fine exhibition of various natural history objects in the lower hall, while several members exhibited specimens under microscopes in the adjoining room.

The following is a brief list of the principal exhibits :—

By Mr. E. S. Anthony.—Collection of aboriginal stone implements, &c.

By Mr. F. G. A. Barnard.—Growing fern, *Polypodium pustulatum*, Forster (syn. *P. scandens*), from Tidal River, Wilson's Promontory, December, 1914; also Australian bird-skins.

By Mr. D. Best.—Case of Victorian beetles.

By Mr. C. C. Brittlebank, on behalf of Science Branch, Department of Agriculture.—Four cases of pathogenic fungi; 12 spirit specimens of Australian phalloids.

(Exhibits continued in August *Naturalist*.)

After the usual conversazione the meeting terminated.

ABOUT "PET PETER," A FLYING PHALANGER.

By J. BOOTH, M.C.E., B.Sc.

(*Read before the Field Naturalists' Club of Victoria, 12th May*, 1919.)

SOME workmen felling gum-trees near Croydon found and secured a small furry animal, which they brought up to the house and gave into the care of the housekeeper. She placed the little creature in a box crowded with fresh gum leaves, and fed it on bread soaked in milk and plastered with sugar. The men were first interested, then experimental, and later somewhat annoying to the little animal; and though it had become very friendly with the housekeeper, on whose shoulder it would perch, and hide in her dress, she decided to send it away from its tormentors, and asked me to take it home with me. This I was very pleased to do, and "Pet Peter" remained with us in Hawthorn till the day of his death.

"Pet Peter" was a phalanger—the Lesser Flying Phalanger —genus *Petaurus*, species *breviceps*, Waterhouse, of the group Phalangeridæ of the order Diprotodontia in the sub-class Metatheria of the Mammalia. Hence our pet was a climbing marsupial, with fore and hind feet prehensile, with an opposable thumb and prehensile tail, and had also "lateral folds of skin extending from fore to hind limbs" which act "as a parachute,"* and with a proper supply of diprotodont teeth.

On arrival home "Pet Peter" was put in a large deal box and provided with plenty of gum leaves; but gum leaves were not very readily obtainable, and seemed to be but little valued by "Pet Peter," and gradually they were discontinued, and a smaller box, with straw and pieces of cloth, substituted to provide warmth, shelter, and retreat. He quite approved, and was fond of both the larger and the interior box. Later he was removed to a wire-net cage or room, 6 x 4 x 10 feet high, overgrown with Virginia and other creepers. Here he lived while life lasted. He is now in the possession of the National Museum, and by the kindness of the Curator, Mr. J. A. Kershaw, F.E.S., he or one of his kind is on the table here this evening.

Being a nocturnal animal, his periods of activity, and so opportunity for observation, did not coincide with ours, and only overlapped by an hour or so in the evening. In these hours he was often introduced to the family, and allowed at large in the house. He rarely left the room in which he was set free, and showed no tendency to abscond. He treated us to very few demonstrations of "flying," although we have seen some fairly long "jumps." But his climbing powers

* Parker and Haswell, "Text Book of Zoology," ii., p. 468.

were astonishing. Not only did mantlepieces, high shelves, picture frames, and even the picture-rail present no more difficulty than floor or table, but picture or blind cords formed perfect surfaces for all the manœuvres of advance, sudden retreat, and active gyration. Human beings neither attracted nor repelled. He had no fear of them; if they happened in his way he ran over them. For him they simply were not. Come for calling? No. Easy to catch? Not much; but if caught it was no trouble at all to "Pet Peter."

When picked up in the evening, or approached in his nest in the day-time, he had no objection to being handled. You could stroke him, curl his tail round your finger, examine his graceful little paws, and he was neither nervous nor complaining; but on one point he was sensitive—very. Try to examine, spread out, or display his "wings," and "Pet Peter" manifested at once the greatest objection. His voice, which was usually a subdued hiss, became a very Liliputian snarl, while he wriggled, backed, and twisted in his most vigorous manner to avoid the desecration.

"Pet Peter" had another characteristic: he was a king of malingerers. To "sham dead" is not uncommon with animals; but "Pet Peter" to all intents and purposes was dead. Pity and interest and thoughts of the museum were the only things that prevented his burial the first time he treated us to an exhibition of his powers in this direction. Limp, eyes staring, and breathless, he exhibited no "response to stimuli," lying flaccid in the hands or on the table for a period of perhaps five or ten minutes; then, with scarcely a sigh of recovery, he would dart to a far corner and continue the romps of the evening. This sham death, which occurred some four or five times, seemed sometimes to be brought on by apparent fright of a cat or dog, but at others without any assignable cause—just a breathing spell in his activities; otherwise, during waking hours, "Pet Peter" took no rest.

He played hide-and-seek well. He was not always ready to be put away into his own apartment when the family were retiring—in fact, it was not always easy to find him, and even finding was not always getting, and so he was often left till the morning. Only once did we fail to get him, and then after an absence of a week he composedly turned up in one of the upper bedrooms; otherwise we never failed to find him eventually, but we had many a long search, and discovered him in strange places. A deep, narrow-necked vase in the centre of the top shelf of an overmantel hid him for a long time the first time he made use of it—I said first time, but I don't think there ever was a second. I am sure there was no third, for "Pet Peter" had no fancy for any particular cranny; but, though

his hiding-places were rarely the same, they were all pretty uniformly good.

At times we brought him out in the day-time, but he was, naturally, very lethargic, and, though we could trick him into running about a bit to show him off to visitors, he seemed very uncomfortable, and tried to burrow at once into the pockets or folds or sleeves of one's clothes. Nevertheless, at any time he was willing enough to wake up sufficiently to take a lump of offered sugar, and eat it in the same pretty manner as he did cockroaches. Yes, our pet was quite fond of sugar. One day we found in a drawer of envelopes and stamps a clean round hole through the papers to a small bag of boiled lollies. The stationery department made a debit of sixpence after patching up as many of the stamps as could be used. Otherwise, in the day-time he preferred quiet, and would be pleased to curl up in the lap for any length of time while sewing or the like was being done. He used occasionally to lick the hands of people with his long, thin tongue ; with imagination one might construe it into a caress.

When he was at large, or almost at large, in his wire house, he was only to be caught during dormant hours, his activity in it, even if he ran almost through your hands at times, rendering it impossible when he had once woke up for the night. It was the practice to feed him when in the wire house once a day in the early evening. He would then answer to a call by name with a hiss, and drop on to the shoulder of the one bringing food. This was practically always the same person, and we certainly think that he came in a way to know her. At these feeding times it was curious to watch him drinking, when he did not perch on the shoulder or hand for a square meal. At these times he would suspend himself over the saucer of milk and drink freely, vertically upwards, gravity and its laws notwithstanding.

For diet, " Pet Peter " liked cockroaches. They were treated as delicate morsels. Chitin was of no use to him ; after he had had five minutes with a member of the Blattidæ it all remained —but nothing, quite nothing, else. Every limb was removed, every femur emptied, and the dry dissected pile left in a neat patch where the meal was partaken of. It was most interesting to watch him, squirrel-like, holding these creatures in his miniature hands, and performing the dissection with skill and rapidity. He also had a taste for millipedes, and did not always spurn Oniscus. On one occasion a number of millipedes had been gathered for him, and he had been fed with a few, the rest being left in the bottom of a glass tumbler to serve for the next meal. " Pet Peter " took the next meal very shortly, inverting himself in the tumbler to take it, and wiped

the platter clean. We tempted him with various other refection, animal and vegetable. Most he would have nought to do with; now and again he would taste a little fruit, or animals other than cockroaches and "millies," but they were all sidelines with him. His one stock and staple diet was the original milk-soaked bread and sugar, or perhaps we should say sugar and milk-soaked bread, for, though he ate the bread and drank some of the milk, it was the sugar, plenty and thick, that he seemed to regard as the essential.

The small size and perfect build, the curious "wings" and squirrel-like hands, so small and cold and naked, the rich, deep fur and delicate tissue-paper-thick ears, the spherical, prominent, bead-like eyes, the tiny pointed mouth and dainty little tongue, with his friendly but independent character, made him a universally admired pet. He was a cleanly animal, and had no noticeable parasites.

I do not know what toll of years would make a *breviceps* feel aged. But one evening, after some cold, wet weather, "Pet Peter" failed to answer to the call for supper, but took it readily enough when offered to him in his nest. He seemed to be lethargic, and the lethargy increased day by day, and his limbs became stiffer. One day his immediate caretaker reported that he seemed to be ill—had caught a cold, or got some rheumatism. He was brought indoors and given an extra good nest, and was fed attentively. But, though his appetite failed but little, his limbs continued to get stiffer, and on the 7th June last year his *corpus* was transferred to the National Museum.

We had brought him down from Croydon on the 16th November, 1912. He had then been about four months in captivity, making his age nearly six years, in addition to whatever time he had lived in his native bush.

"SCIENCE AND INDUSTRY."—The first number (May, 1919) of this new publication, which is the official journal of the Commonwealth Institute of Science and Industry, is to hand. Its aims, as set out in the "Foreword," are good, and we trust in due time will become accomplished facts. Many diverse subjects are dealt with. In an article, which shows the effect of environment on plants, Dr. J. B. Clelland deals with the terrible "prickly pear" pest in Queensland and northern New South Wales, the illustrations showing the widespread effects of the scourge. Fortunately Victoria is free from this plant as a pest, but the planting of sweetbriar and African boxthorn as hedge plants in this State should be absolutely prohibited, if we are to remain free from a similar menace. The journal is to be published monthly, at one shilling per copy.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 14th July, 1919.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about sixty-five members and friends were present.

REPORTS.

In the absence of the leader, Prof. Sir W. Baldwin Spencer, K.C.M.G., D.Sc., M.A., F.R.S., a report of the visit to the National Museum (Ethnology branch) was given by Mr. A. D. Hardy, F.L.S., who said that about twenty-two members had attended. The Professor first gave an outline of the course he proposed to follow, dealing firstly with the everyday life of the aboriginal, and secondly with their sacred rites. In viewing the exhibits, special interest was shown in the case showing Australian stone implements of different kinds along with exactly parallel examples from different parts of Europe, thus demonstrating in a striking manner the similarity between present-day tribes in Australia and the people of the Eolithic, Palæolithic, and Neolithic periods in the old world before the dawn of history. Canoes, weapons, and samples of native weaving with bark, hair-string, &c., were also sources of attraction to many, and a much longer time could have been profitably spent under the guidance of Sir Baldwin, but another engagement compelled him to curtail his remarks.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. C. Barlow, 95 Raglan-street, St. Kilda, and Mrs. M. M. Cochrane, P.O., Murrumbeena, were duly elected as ordinary members; Miss K. Currie, Lardner, Mr. J. C. Goudie, Sea Lake, and Rev. W. W. Watts, F.L.S., as country members; and Miss Valmai Cochrane, P.O., Murrumbeena, as an associate member of the Club.

GENERAL BUSINESS.

The president welcomed Dr. (now Major) W. Macgillivray, of Broken Hill, who had just returned from the front. Major Macgillivray, in acknowledging the welcome, gave some interesting particulars of the sea-birds which he had seen on his way to England, notably those around South Africa. He said that Petrels had been seen 1,200 miles from the nearest land. He also mentioned the Terns, of which several species

were seen, the most abundant being *Sterna melanophrys*. Calling at Sierra Leone, he found it full of interest, the streets and parks being gay with gorgeous butterflies. In England he had met Mr. Gregory Mathews, who has, for some ten years past, been making an exhaustive study of Australian birds. He mentioned also that, in his opinion at least, Australian birds compare favourably with those of the old world in the matter of song, in spite of the poetic protestations of English writers. In concluding, he thanked the members for their kind welcome.

Mr. G. A. Keartland mentioned that a new park was in course of preparation at Preston, near Reservoir station, and that it would be a splendid opportunity for the creation of a bird sanctuary, as game was sure to seek the lake which is now being constructed, and would afford excellent material for study if unmolested. Mr. Keartland said that he believed that the shire council was favourable to the proposal, and moved that it be urged by the Club to have the park declared a sanctuary.

In seconding the motion, which was carried unanimously, Mr. F. G. A. Barnard mentioned the part the Club had taken in having Wattle Park, near Burwood, declared a sanctuary, as a precedent for action in the present instance.

REMARKS ON EXHIBITS.

Mr. C. L. Plumridge exhibited fronds of a tree-fern, *Dicksonia antarctica*, garden grown, showing abnormal frondage, stating that when planted it was wholly normal, and remained so until its fourth year, when a slight crimping manifested itself on one of the fronds. This crimping has become more pronounced in successive seasons, until now some of the fronds are wholly crimped, while in very few is it wholly absent. From this specimen he hoped to be able to propagate a new tree-fern, wholly crimped. He also showed a tailed spider which had not come under his notice before. It builds a cylindrical nest or shelter, from which it appears never to emerge, but lives therein permanently, with its head just projecting from the front of the shelter. On being disturbed it spins rapidly round, apparently hoping thereby to escape detection. The specimen was identified by Mr. F. Spry as *Arachnura higginsi*, L. Koch.

Mr. G. A. Keartland called attention to a very old male Grey-backed Goshawk, *Astur clarus*, which had lost the barred markings on the breast. This specimen was difficult to identify on account of this fact, which is not recorded by either Gould or Mathews, but is stated by North.

PAPER READ.

By Mr. J. Searle, entitled "Gleanings of a City Naturalist." The paper, which dealt with the various insects, &c., which

had been noted during several months in a Collins-street office, proved very interesting, more especially as it was illustrated by a series of lantern slides, among which were many excellent micro-photographs of insect anatomy.

The chairman said that the author's remarks were of rather a novel nature, although there was no reason why this should be so, as the work was not only extremely interesting, but also inexpensive, and hence within reach of all. He suggested that other members should make lists of insects, &c., noticed by them at various times in their houses, as he considered that these would make very interesting reading when collected from the different suburbs. He desired to thank the author for the introduction of such an enticing subject.

Messrs. J. L. Robertson and F. G. A. Barnard also expressed their thanks to the author, the latter mentioning that some years ago a specimen of the rather rare beetle, *Schizorrhina Phillipsi*, had been taken in a banking chamber at Kew, and, a year later, another specimen of the same species was found in the same office—a circumstance which he had not heard equalled.

NATURAL HISTORY NOTES.

Mr. A. L. Scott said that he had a hazy idea of what glow-worms were like, and thought that those he had seen were the larva of one of the diptera. He saw one of these lately, and, after what Mr. H. B. Williamson had said on this subject, had taken particular notice of the area to which the glow was confined. This area, he found, was about three-quarters of the length of the back, the anterior and posterior and the whole of the ventral surface not being illuminated. He suggested that the phosphorescence may have been caused by micro-organisms.

Mr. Williamson referred to phosphorescent earthworms, of which he had had specimens at different times. One particularly, when washed and placed on a damp cloth, glowed when stroked, and the finger also glowed when this was done, thus pointing to the explanation which was offered concerning bacterial agency as a cause of the phosphorescence.

The chairman spoke of the firefly of the tropics—a small beetle, perhaps a quarter of an inch in length and a sixteenth of an inch broad. These exhibited phosphorescence only on the ventral surface of the terminal segments of the abdomen, and then only in flashes, and not continuously. The light is of a brilliant electric blue colour, and a number (usually twenty or more) are put together under a tumbler to give a continuous light. In Japan, according to Mr. Robert Hall, this is the only form of illuminant used in the third-class compartments on the Japanese railways. He called attention

to a helpful paper on the subject of phosphorescence, by Miss F. Bage, M.Sc., to be found in the *Victorian Naturalist* for November, 1904 (vol. xxi., p. 93).

Dr. Macgillivray mentioned that he and Mr. Keartland saw numbers of fireflies in North Queensland. Their light was visible for a distance of at least 300 yards. Their flight was slow, and there were many thousands in one swarm which was observed. He also referred to the bacterial phosphorescence so often noticed by voyagers in the tropics, although the phenomenon is by no means confined to the Torrid Zone.

EXHIBITS.

By Mr. G. A. Keartland.—Specimen of an old male Grey-backed Goshawk, *Astur clarus*, which had lost the barred markings on the breast, shot at Kew.

By Miss G. Nokes.—Specimen of branching red coral, *Corallium rubrum* (?).

By Mr. C. L. Plumridge.—Fronds of Valley Tree-fern, *Dicksonia antarctica*, showing abnormal growth, in illustration of note; spider, *Arachnura higginsi*, L. Koch, with shelter, taken at Kew.

By Mr. J. Searle.—Specimens under microscope, in illustration of paper.

EXHIBITS AT JUNE MEETING.

(Continued from p. 48.)

By Mr. J. Carter.—Swan-neck moss and insect preparations (under microscope).

By Mr. J. Cronin.—Growing Victorian ferns in pots, from Melbourne Botanic Gardens, also branches of Lilly-Pilly and leaves of Cabbage Palm for decoration of hall.

By Mr. F. Chapman, A.L.S.—Under microscope, a series of extra large rock sections prepared to show structure, including Oolitic limestone from Clifton, England; contorted gneissose structure from Alaska, &c. Fossils from elevated beach deposits and the tertiaries of Ooldea Well, Trans-Australian railway, collected by Mr. L. Chandler, including representatives of the genera Arca, Venus (Chione), Pecten, Pinna, Mytilus, Fusus, and Bulla.

By Mr. H. Clinton.—Bird parasites, &c. (under microscope).

By Mr. C. E. Cole.—Australian Coleoptera.

By Mr. C. Daley, M.A.—Minerals found in conjunction with gold in Victoria, also quartz crystals and various varieties of quartz.

By Mr. J. E. Dixon.—Victorian Coleoptera—families Tenebrionidæ and Curculionidæ.

By Mr. C. French, on behalf of Science Branch, Department of

Agriculture.—Cabinet drawers of Australian coccids (scale insects), including a number of new species from the Mallee, collected by Mr. J. E. Dixon, and elsewhere; cabinet drawer of Australian and British butterflies and moths.

By Mr. J. Gabriel.—Polyzoa, &c., under microscope.

By Mr. C. J. Gabriel.—Victorian marine Mollusca, with their egg-capsules.

By Mr. R. A. Keble.—Morwell brown coal and its distillation products.

By Mr. F. Pitcher.—Mounted specimens of twelve rare Victorian ferns; collection of Victorian mosses; and collection of Victorian marine algæ.

By Mr. C. L. Plumridge.—Growing Victorian ferns—viz., *Adiantum hispidulum, Davallia dubia,* and *Lomaria fluviatilis.*

By Mr. A. L. Scott.—Rock sections, plain and polarized, under microscope.

By Mr. J. Searle.—Type specimens of Copepoda, also flower of *Ruppia maritima* (first time exhibited), under microscope.

By Mr. P. R. H. St. John.—Fruit specimens of *Gaultheria hispida,* R. Br.; "Wax-cluster or Snowberry," from Mt. Buffalo, collected by Mrs. J. Lang; also bag made from inner bark of the Red Stringybark, *Eucalyptus macrorhyncha,* by Mrs. F. Walker, of Ringwood.

By Mr. J. Stickland.—Vorticella, &c. (under microscope).

By Dr. Griffith Taylor, F.G.S.—Three new wall maps of Australia, from the Oxford Press, showing (*a*) vegetation zones, (*b*) population, (*c*) political features; geological specimens from South Victoria Land, East Antarctica, obtained during 1910–13 expedition; kenyte lava from Mount Erebus, showing large felspars, weathered out by frost and wind; basalts from Observation Hill, with curved joints; striated dyke rocks from Granite Harbour; weathered beacon sandstone from Mount Svess.

By Mr. L. Thorn.—Victorian butterflies, collected at Wandin and Ferntree Gully.

By Mr. J. Twyford.—Examples of the Brownian movement (under microscope).

By Mr. H. B. Williamson.—Collection of dried plants made by scholars of Hawkesdale school.

By Mr. J. Wilcox.—*Melicerta ringens,* &c. (under microscope).

After the usual conversazione the meeting terminated.

Victorian Fisheries.—The report by the Royal Commission appointed to inquire into the fishing industry has just been presented to Parliament. One of the principal decisions arrived at is that properly organized biological research must take the place of guesswork in ascertaining the life-histories of our food fishes.

EXCURSION TO STUDLEY PARK, KEW.

QUITE a large party assembled for the outing to Studley Park, Kew, on Saturday, 17th May, and, though listed for the study of eucalypts, the Park, covering rather more than 200 acres, and possessing about four miles of river frontage, offers so many opportunities to the naturalist that it was hard to keep the attention of the twenty-five or so who attended directed to the object of the afternoon. Near the meeting-place at Johnston-street bridge the contorted Ordovician strata exposed along the roadway leading to the pumping station first attracted attention. Ascending to the high ridge overlooking Dight's Falls, the fine view of the city was greatly admired, and attention was called to the fact that, as occasionally chipped stones may be picked up there, at one time the aboriginals probably frequented it when on fishing excursions to the neighbouring Yarra, and in support of the fact one of the party secured a characteristic flake. Descending the pathway towards the boat-houses, specimens of *Eucalyptus leucoxylon*, the Yellow Gum, were pointed out encroaching on the territory of the River Red Gum, *E. rostrata*, which delights in river flats with deep soil. Several old Yellow Gums were of exceptional interest, for from the convex side of their bent trunks the bark had been removed scores of years ago by the natives in order to construct canoes. Though the Yellow Gum here is a somewhat crooked, straggling tree, in the Western District, where it has been cultivated by the Forest Department, it provides fine, straight stems, suitable for telegraph poles, &c. We then followed up a little valley, and soon left the riverside vegetation behind, getting among the Manna Gums, *E. viminalis*, the Swamp Gums, *E. ovata*, and the Yellow Box-Gum, *E. melliodora*. Here a little time was spent in noting the differences in the juvenile and adult foliage of the three species. Near the top of the ridge was seen a young Yellow Gum struggling for existence. It had been truncated some years ago at about ten feet from the ground, a few inches above a point where a mistletoe (Loranthus) had established itself; this was balanced on the opposite side of the trunk by an equal quantity of branchlets bearing "reversionary" foliage. At the time of our visit this latter had survived and the parasite was quite dead. Not far from this, and nearer to Studley Park-road, there is an old Yellow Box, about four feet in stem diameter and some thirty feet high. This tree forks into rather large limbs at ten feet from the ground, and growing from a cavity in the fork is a healthy specimen of the Lightwood, *Acacia implexa*, now about fifteen feet high, having a stem diameter of about six inches. Evidently a seed of the Lightwood had germinated in a decayed part of the host tree,

where it had lived a more or less parasitic or saprophytic existence until the roots had penetrated to the ground through the decayed heart-wood of its host. Among some planted trees along the northern side of the road it was noticed that the Mahogany Gums, *E. botryoides*, had done well, while the Sugar Gums, *E. cladocalyx*, were a poor lot. The Blue Gums, *E. globulus*, had long lost their vitality, and should be removed, to the benefit of their neighbours, as they form a breeding-ground for timber-destroying insects. At a pool in a disused gravel-pit a White-fronted Heron was undisturbed by our presence when passing close by, and continued its scrutiny of the pool, though separated by only a post and rail fence from a main road bearing much traffic. This portion of the park contains a few Sheokes, *Casuarina suberosa*, and Cherry Ballarts, *Exocarpos cupressiformis*, besides Manna Gums and a number of well-grown exotic trees. We then visited the surroundings of the abandoned fish-hatcheries, and made our way towards Mr. Gabriel's house, Mr. Gabriel pointing out some gum-trees which horses had barked, a somewhat unusual practice. We were then kindly invited by our vice-presieent to partake of afternoon tea prepared by Mrs. Gabriel and family, which we greatly appreciated, and before separating a vote of thanks was enthusiastically tendered to our entertainers.—A. D. Hardy.

A New Isopod.—In the report of the excursion to Lake Corangamite, at Easter, 1918 (*Vict. Nat.*, June, 1918), mention is made, on page 27, of the discovery of an isopod, which would probably prove new to science, by Mr. J. Searle, in the shallow water on the western side of the lake. In a recent letter to Mr. Searle from Dr. Chilton, of Christchurch, N.Z., to whom specimens were sent for identification, he says :—" The isopod proved to be of considerable interest. I have made a new genus for it, and in your honour have named it *Haloniscus searlei*, sp. nov." Type specimens of the new crustacean, which closely resembles an ordinary woodlouse, have been deposited in the National Museum, Melbourne.

Australian Wattles.—Mr. E. E. Pescott, F.L.S., in continuation of his articles in the *Victorian Journal of Agriculture* on " The Australian Flora from an Ornamental Aspect," deals with the wattles in the July journal. He lists about fifty species which are worthy of garden cultivation, mentioning their several features. He also gives some particulars of the pests to which the trees are subject, as well as hints about pruning, which should be undertaken when the trees are in flower, or shortly after.

A WEEK AMONG THE SEAWEEDS AT PORTSEA.

BY A. H. S. LUCAS, M.A., B.Sc. (Hon. Member).

(*Read before the Field Naturalists' Club of Victoria, 12th May*, 1919.)

FEELING, early in the year, that I would be the better for a change of scene and air and activity, I bethought me of the seaweeds I had gathered 16 years ago in Victoria, and decided to put in a week's collecting at Anglesea, where I had once had good hunting with Mr. H. T. Tisdall. I could not secure a room at Anglesea, however, and so thought I would try ground new for me, at Portsea, not far from Port Phillip Heads, for with ocean and bay shores one ought to be able to see a good many kinds; and had not Mr. Tisdall written in the *Victorian Naturalist* (vol. xiv., pp. 7, 86) enthusiastically on the sea-flora of Sorrento, and had not Mr. Bracebridge Wilson dredged the sea-floors of the whole neighbourhood, with magnificent success? So Portsea it was. On my return to Melbourne I paid a visit to my old friend the editor, and, after he had recognized me, he claimed a paper for the *Naturalist*. As seaweeds are not aggressively botanical, he seemed to think that members would be pleased to hear something of them.

The steamer left Port Melbourne an hour after the usual time, and as I had gone a little early to arrange for the luggage, which included a formidable looking and weighing Sydney Herbarium press, I had time to inspect the sandy beach. Good plants of *Sargassum Gunnianum*, J. Ag., *S. bracteolosum*, J. Ag., and *S. leptopodum*, J. Ag., were being floated in, and with them the two Cystophoras, *C. uvifera* (Ag.), J. Ag., and *C. cephalornithos* (Lab.), J. Ag.—the former with spherical and the latter with barleycorn-shaped floats. Small boys with bare legs proved handy, and were interested when they were shown that the floats were not fruits (sea-currants), but served to keep the growing plant erect in the water. I should say that careful gathering on this beach would yield quite a number of Sargassa—I got *S. undulatum*, J. Ag., at Sandringham—and Sargassa are troublesome plants to collect on the ocean coast; they live in water just too deep as a rule, and too near the rocks to allow of safe dredging.

The trip was a comfortable one, with smooth sea, moderate temperature, and clear air. I could almost see the familiar odour of the onions as we passed Portarlington. I did not notice much floating weed. We called at Queenscliff. The wharf piles were covered above with green and lower with brown algæ, as the text-books prescribe. The green—vivid green—streamers of *Ulva lætevirens*, Aresch., must have been over two feet long. I was rather surprised to find that Brace-

bridge Wilson did not include it in his "List of Algæ from Port Phillip Heads and Western Port." I suppose it was too near land to engage his sympathy. What the browns were I cannot say, but at Portsea pier we had little green but a great deal of the long trails of *Macrocystis pyrifera* (Turn.), Ag., which there reaches to a dozen feet in length. We circumnavigated to Sorrento, and after many mysterious and hieroglyphical curves we were placed alongside the pier, at the base of which we were crowded (Sargassa and all) into a 'bus which rolled us into Portsea. At the big boarding-house I was provided with a corner of the verandah curtained off, and here and hence for a week I conducted my phycological investigations. My fellow-boarders seemed to take a kindly interest in my proceedings. Some of the boys were eager to present me with specimens, and in this way I obtained a very fine example of *Caulerpa Sonderi*, F. v. M. One little lady assisted me to mount the weeds, and was very proud to float out some by herself and for herself.

The first thing was to learn the topography and the second to find the times of the tides. I first made for the Back Beach —*i.e.*, the one which fronts the ocean. The whole of the peninsula between the Sorrento–Portsea road and the Back Beach is covered with tea-tree scrub of the most uncompromising character. The width is only about a mile and a half, but it would be good going to make your way across the scrub, using the tomahawk freely, in a day. Fortunately, a good narrow road has been made, so that one can reach the Back Beach in half an hour's walk. Where the road has been cut in the sand the sides are held up by tea-tree. I saw very few plants in flower as I passed, but at the point where the road ended on the top of the slope to the sea the bushy Composite, *Calocephalus Brownii*, F. v. M., was full of heads of blossom. A curved track, ending in a broken ladder, led down to the shore, but it was easy enough to go down anywhere, and later on I saw the advantage of the ladder, for some visitors were using parts of it to light a fire for their "billy."

Just in front of the foot of the descent the sands were in contact with a flat reef stretching out for 50 to 100 yards, ending in very ugly-looking rocks over which the seas were breaking, and hollowed out irregularly in shallow and deeper rock-pools. To the east a long sand stretch without reefs, but to the west the reefs grew higher and more numerous, and were interrupted by ridges of the land running out in miniature promontories. The first of these ridges has been hollowed out in a tunnel by the waves, and is accordingly termed "London Bridge." The next is similarly perforated, but I heard no

name for it. Thereafter the Quarantine Ground commences. My Back Beach work, then, was to catch the rock-pools at the lowest tide available, and to hope for a mighty swell to come and pile up the inaccessible treasures growing about the outside reefs in a convenient form for sampling. However, I may say that no swell came, and that all I gathered was by persistent work. I stayed long enough that day to note the run of the tides.

The most charming of the rock-pools were those largely occupied by Caulerpas. I found seven species growing, and picked up two others. Wilson dredged twelve kinds in his limits. *C. scalpelliformis* (R. Br.), Ag., and the rare *C. trifaria*, Haw., were nestling under Sargassum and Cystophora in shallow pools a foot or two deep. There was a beautiful grove of *C. Muelleri*, Sonder, covering the floor of a pool eight or nine feet deep. They looked like fir branches waving, for the tide communicates with most of these deeper pools. *C. cactoides* (Turn.), Ag., sent long rhizomes into rock crannies at an intermediate depth. The others were *C. Brownii*, Endl., *C. sedoides* (R. Br.), Ag., both bright green, and *C. Sonderi*, F. v. M., very much darker in shade. Everyone is struck with these marvellous Siphoneæ, plants assuming the forms of cactus, fir, club-moss, stone-crops, plumes, and serrated scalpels, each plant practically one huge all, without subdivisions, and because, though observed in hundreds by botanists all over the world for at least a hundred years, no organs of reproduction have been discovered in any of the seventy-five known species.

Others of the pools were occupied by a brown tenantry. In one small pool I noted *Cystophora spartioides*, J. Ag., with flat stem, the branches coming off the edges; *Hormosira Banksii* (Turn.), Decaisne, with its necklace-like fronds; *Seirococcus axillaris* (R. Br.), Grev., with fruit receptacles growing along the edges of the frond; *Cystophora uvifera* (Ag.), J. Ag.; *Ecklonia radiata* (Turn.), J. Ag., like prickly brown rhubarb; and young Macrocystis. I found, thrown up, several plants of *Ecklonia laniciloba*, Sonder, which has a midrib three inches or more broad, and pinnate linear lobes on each side, perhaps a foot long. It has quite a distinct appearance from its congener, but apparently no one has recorded it from Victoria before; Sonder's specimens were from South Australia.

Padina pavonia (L.), Lamx., seemed to prefer to reserve small pools for itself in which to display its wavy iridescent fans. In several pools *Cymodocea antarctica*, Endl. (according to Bentham), was growing, but not, as I saw it, luxuriantly. It is a phanerogam with a wiry stem and stiff, cut-out, green leaves at the summit, and is usually covered with green,

brown, and coralline seaweeds. It is a good rule never to pass a thrown-up plant of Cymodocea without looking it over to see what is growing on it ; you gain all sorts of treasure trove in this way. Thus, I found *Mychodea pusilla* (Harv.), J. Ag., and *Pollexfenia crispata* (Zan.), Falk., on Cymodocea—neither of them recorded by Wilson. At Anglesea the elegant form of *Corallina Cuvieri*, Lamx., predominated on the host, but at Portsea I did not see this form at all, its place being taken by the condensed and hence coarser-looking "*forma β.*" The Stellate Coralline, "*Amphiron stelligera*" of Harvey, was common, but the other two species, *granifera* and *charoides*, did not appear. A plant of Cymodocea bearing sprays of this pink coralline is a beautiful object. Tisdall, in his paper in the *Naturalist*, stated that the algæ only attach themselves to the nodes of the Cymodocea. While the nodes afford the firmest attachment, the internodes are sufficiently firm, and the smaller algæ attach themselves anywhere along the stem.

Attached to the sides of the big rocks bordering the tidal channels, great fronds of *Sarcophycus potatorum* (Lab.), Kuetz., and Macrocystis are tossed to and fro in the advancing and retreating waves. The former has broad (to a foot) leathery-looking fronds, with a thick, solid stipes, and is the stoutest of Australian algæ. In Tasmania, where it attains a much greater size, fishermen will moor their boats to the strong stems. The attachments of these kelp-forming brown weeds are interesting. Sarcophycus has a single broad disc. Macrocystis is attached by a number of spreading holdfasts, like the adventitious roots of Ficus ; these branch several times, and each branchlet ends in an adhesive disc. The pattern varies again in Ecklonia and Phyllospora. These are our chief kelp plants, and from them can be obtained good percentages of potassium chloride and mannitol.

On the surface of the reef, exposed at low water, there was abundance of *Splachnidium rugosum* (L.), Grev., the plants growing gregariously where they get the splash of the waves. The plant looks like a diminutive branched sausage ; the branches are but half an inch in diameter, and have a transparent, slimy, jelly-like content, which makes the plant a troublesome one to mount with effect. It grows near Sydney, but I have never seen so fine a specimen as Harvey figures in his " Phycologia Australica." The average height is not much more than four inches. Another plant usually growing in such situations is *Laurencia obtusa* (Huds.), Lamx., one of the most puzzling algæ because of its infinite varieties of form.

In the pools, and captured by the tufts of Hormosera, one finds, even without the great swell, a number of drifted algæ.

At Portsea the Plocamiums were, as all along the ocean coast, in great evidence, and are the plants most generally admired by amateurs. Their fern-like shape and brilliant crimson colour make them universal favourites. I gathered four species at Portsea. To my surprise, *P. Preissianum*, Sonder, segments in threes, seemed to be the commonest. *P. angustum* (J. Ag.), H. and H., was also abundant. *P. Mertensii* (Grev.), Harv., with serrated segments, was more common than *P. procerum* (J. Ag.), Harv., with entire segments. Probably the two are just forms of the same species. I did not meet with *P. coccineum* (Huds.), Lyngb., which is the common British species, and occurs in most Antarctic dredgings, and is not uncommon off southern Australia and Tasmania. I only saw one fragment of *P. costatum* (J. Ag.), H. and H., though it was plentiful at Anglesea and Barwon Heads. I was very glad to obtain specimens of *Dictyota nigricans*, J. Ag. It seemed to be not uncommon, and I had found it at Barwon Heads. I was also lucky to secure a good plant of *Bellotia eriophorum*, Harv., showing its umbels of feathery, globular tassels.

I made four trips to the Back Beach altogether, but, as I did not expect, made more captures on the shore of the Bay. Just below the fort I struck a small, low breakwater of big stones which served to arrest and divert the incoming algæ. Here I found several algæ of rarity and interest, including *Scinaia furcellata* (Turn.), Bivon., *Pollexfenia crispata* (Zan.), Falk., *Bindera splachnoides*, Harv., with a new Herposiphonia. Cymodocea gave abundance of *Dicranema Grevillei*, Sond.—an alga which never grows on anything else—of *Pachydictyon paniculatum*, J. Ag., and *Lobospira bicuspidata*, Aresch. Two or three plants of *Nitophyllum Gunnianum*, Harv., and dozens of *N. affine*, Harv., were thrown up, as also *Champia affinis* (H. and H.), J. Ag., *Wrangelia clavigera*, Harv., *Haloplegma Preissii*, Sonder, *Delisea elegans* (Ag.), Mont., *Crouania australis* (Harv.), J. Ag., and *Muellerena insignis* (Harv.), De Toni. On some rocks exposed at low water grew *Helminthora tumens*, J. Ag., and *Ceramium clavulatum*, Ag. In all, I collected over 100 species at Portsea.

Victoria is singularly well off for algæ. There is good collecting in the Bay at Sandringham and Williamstown, close at hand; and for a holiday in summer, when the algæ are fruiting, the whole coast of Bass Strait is a seaweed paradise. Probably nowhere else in the world are the algæ more numerous in species and individuals. They are beautiful objects. There is some sport in their capture, and the study of them, their structure, and their physiology, throws striking light on the nature of plant life in general. Will not some members of the Club help by taking up the study?

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting was held at the Royal Society's Hall on Monday evening, 11th August, 1919.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about 35 members and visitors were present, the curtailment of train and tramway services, owing to the seamen's strike, being doubtless responsible for the small attendance.

CORRESPONDENCE.

From the Town Clerk, Preston, stating that the Club's suggestion that Edwardes Park should be proclaimed a bird sanctuary had been adopted, and the necessary steps initiated. The president remarked that in the course of a few years the park would probably make a good excursion locality.

REPORT.

A report of the excursion to Hurst Bridge on Saturday, 9th August, was, in the absence of the leader (Miss A. Fuller), given by Mr. F. G. A. Barnard, who said that there had been a good attendance of members, but that, owing to the lateness of the wattle season, the excursion was at least a fortnight too early, as hardly a Silver Wattle was fully in blossom. The party had rambled up the picturesque Arthur's Creek valley for a mile or so, and enjoyed the outing very much. Very few other plants were found in bloom except the lowly, sweet-scented *Drosera Whittakeri*. The Cootamundra Wattle, *Acacia Baileyana*, was, however, making a fine show in private gardens.

The chairman said that it might be better in future years to defer fixing the date of the "wattle excursion" until it was seen at what date the Cootamundra Wattle blossomed, as this species was generally two or three weeks earlier than the Silver Wattle. Mr. C. C. Plante supported this idea. Mr. F. Pitcher said that at Belgrave (Dandenong Ranges) the Silver Wattle would not be in full bloom before the end of the month.

WELCOME.

The chairman took the opportunity of welcoming back to Victoria one of the Club's members, Mr. F. A. Cudmore, after three years' service in the British Army during the Great War.

ELECTION OF MEMBER.

On a ballot being taken, Mr. Chas. Lambert, Bank of New

South Wales, Melbourne, was duly elected a member of the Club.

EXHIBITION OF WILD-FLOWERS.

The chairman drew attention to the forthcoming annual exhibition of wild-flowers to be held in the Melbourne Town Hall on Tuesday, 30th September. It had been decided to divide this year's profits between the Anzac House Fund and a fund for publishing the common names of Victorian plants as determined by the Plant Names Committee. Owing to pressure of work Miss A. Fuller had been unable to again act as convener of the ladies' committee to undertake the sale of flowers, &c., and Mesdames Coghill and Edmondson had kindly consented to act instead. Owing to the uncertainty of the season, he urged members to use every effort to secure flowers from country friends, and so ensure the success of the exhibition.

EXCURSION LIST.

Mr. E. Cox drew attention to the omission of pond-life from the objects of the excursion to Cheltenham on Saturday, 23rd inst. Mr. C. Daley, M.A., said that the Railway Department's excursion to the Grampians would start on the 20th September, not the 22nd, as printed in the list.

REMARKS ON EXHIBITS.

Mr. H. B. Williamson called attention to his exhibit of fossil marine shells obtained from a bore at Croydon, near Adelaide, South Australia, over 400 feet from the surface. They were of great interest from the fact that the bed is of Upper Pliocene age, and about 150 feet in thickness in that locality.

PAPER.

By Miss C. C. Currie, entitled "The Birds of a Gippsland Garden."

In the absence of Miss Currie, the paper was read by Mr. F. G. A. Barnard. It gave an interesting account of the various birds which visited from time to time a well-sheltered garden situated in the Lardner district, about five miles south of Drouin. Miss Currie's remarks caused considerable discussion.

Mr. F. E. Wilson thought that there must be some mistake about the Bell Miner being heard as far as three miles from the main colony, as it was very unusual to find these birds more than a few hundred yards from their nests. He also had never heard of Mountain Thrushes partaking of a vegetable diet such as acacia seeds, and suggested that they may have been searching for insect life on the trees.

Mr. C. Daley and Mr. J. A. Kershaw supported Mr. Wilson's remarks about the Bell Miners. Mr. Kershaw said that he did

not think the parent Swallows threw the young out of the nest to avoid the heat, being of opinion that the young birds throw themselves out in their efforts to escape the heat of an adjacent roof.

Mr. H. B. Williamson desired to congratulate Miss Currie on her paper, and suggested that, in view of the great variety of birds to be met with in the district, an excursion be arranged for the locality.

Mr. F. Keep asked whether the statements made from time to time about the cruelty of the Kookaburra were true.

Mr. P. R. H. St. John, in reply, said the Kookaburra fully deserved all the hard things said of it. He had not heard before of the Brush Wattle-bird mimicking other birds.

Mr. J. Gabriel said that he had recently seen numbers of Zosterops at his grape-vines, but, as they continued visiting the vines long after all the grapes had been picked, he concluded they were searching for insects. He remarked that he had recently seen a Brush Wattle-bird in the Botanic Gardens, where they had become very tame, taking sugar from one of the tables near the tea-house.

Mr. E. E. Pescott said that the Kookaburra was of considerable service to gardeners on account of its practice of killing Miners, &c. ; at the same time he had to admit that it is a very destructive bird among the smaller native birds.

Mr. J. Gabriel mentioned the rather unusual case of a White-fronted Heron making its home in Studley Park.

Mr. J. Searle considered this was due to the Heron having found a pond well stocked with tadpoles and yabbies (fresh-water crayfish), and mentioned the peculiar habit these birds have of disembowelling tadpoles before eating them.

Mr. St. John remarked on some unusual bird visitors to the Botanic Gardens, and said that he had recently shot a fine Darter on the lake. Only the second time this bird had been seen in the vicinity.

In reply to a question by the president as to the difference between the Bell-bird and the Bell Miner, Mr. F. E. Wilson said that the Bell-bird is never seen in Gippsland, its habitat being the north-western parts of the State. He imitated the notes of the two birds, showing the difference between them, and said that the common Starling was an excellent mimic, and its powers are such that if Starlings are known in the locality no ornithologist should record a bird on hearing the note only, as it may only be a Starling amusing itself, and he was inclined to think that the Bell Miners mentioned by Miss Currie as visiting her garden, being very shy birds, were recorded by the note alone, which was probably produced by a Starling.

The president considered the discussion which had ensued on the reading of the paper a most instructive one, and regretted that Miss Currie was not present to support her remarks.

NATURAL HISTORY NOTES.

The president said that a returned soldier who had taken part in the Palestine campaign had told him that in Egypt mosquitoes had been seen twelve miles from the nearest water, and asked if this did not clash with the present ideas regarding these insects, as the average flight is considered to be less than a mile.

Mr. J. Searle said that there was probably some small pool of water somewhere in the vicinity, and remarked that in the case of the mosquito pest at Panama it had been found that the water collected in hoof marks or a broken bottle was sufficient to provide a breeding-place for them.

EXHIBITS.

By Mr. A. S. Blake.—Specimens of *Eucalyptus melliodora*, bearing peculiar galls.

By Miss C. C. Currie.—Specimens of giant club-moss, *Lycopodium densum*, from Lardner, Gippsland.

By Mr. F. Cudmore.—Clams and triton (sp.) from Suva, Fiji; lava and hat-bands made of shells (Pecten, sp.) sewn together, from Hawaii; serviette rings made of bamboo and plant fibres interwoven, from Hawaii.

By Mr. J. Searle.—The new crustacean, *Haloniscus searlei*, Chilton (genus and species new), from Lake Corangamite, taken by exhibitor, April, 1918; 53 lantern slides, about 30 micro. preparations, and also mounted specimens of various insects, in illustration of paper.

By Mr. L. Thorn.—Top and lower jaws, showing teeth, of the Bull-dog Shark, *Cestracion phillipi*, commonly known as Pig-fish, caught in Port Phillip Bay, off Aspendale. The egg cases of this shark are common objects on the beach, being leathery, spirally-twisted structures.

By Mr. H. B. Williamson.—Fossil shells from bore at Croydon, near Adelaide, S.A., and dried specimen of *Pimelea Williamsonii*, J. M. Black, new species, collected by exhibitor at Murrayville, N.W. Victoria, December, 1916.

After the usual conversazione the meeting terminated.

A Sign of Spring.—A freshly emerged specimen of the Australian Admiral Butterfly was seen flying at Kew on 13th August.—F. G. A. B.

ON THE GROWTH, &c., OF THE SEA TASSEL, *RUPPIA MARITIMA*, LINN.

By C. S. SUTTON, M.B., B.S.

At Easter, 1914, some dry mud was brought from Phillip Island for examination for crustacean life and placed by Mr. J. Searle in a bottle with water on a shelf at his business premises. Two years later a plant with slender, filiform stems and leaves, which had been noticed growing from the mud, showed signs of flowering. Developments were carefully observed and noted by Mr. Searle until the completion of the seasonal cycle of the plant when he concluded it was *Ruppia maritima*, or Sea Tassel, belonging to the Naiadaceæ, or Fluviales, an inhabitant of brackish and salt water in temperate and sub-tropical regions throughout the world. Although urged to do so, Mr. Searle would not directly communicate his most interesting notes, but handed them to me, suggesting I should give them instead. Thinking this might be better done after I had myself continuously observed the plant under more favourable conditions, Mr. Searle gave me a portion, which I planted in sand in a flat glass tank filled with fresh water.

The following description of the interesting performances of the Ruppia, is then, really a relation of what Mr. Searle previously noted and what I have confirmed by my own observations. The stems of the plant arise from a creeping rhizome, and are slender, filiform, finely-grooved, and very long, lying at length on the surface of the water, but not projecting above it. At the beginning of October, about six weeks earlier than in the previous season (perhaps on account of the more favourable conditions as to light and heat), flower-spikes were noticed developing apparently within the thickness of the stems, which were dilated just above certain of the nodes. These spikes, as they increased in size, separated the leaves nearest to the nodes, showing them to be axillary, transparent sheaths from base of leaf and stem remaining, through which the spikes and their commencing stalks could be now more plainly seen. (Fig. 1.) The stalks or peduncles quickly lengthened, eventually somewhat abruptly bringing the spikes to the surface, or even projecting them some distance above it, where they finally lay. The spike appeared to consist of two flowers, each of four anthers or pollen sacs in superimposed pairs, with the carpels clustered on one side of the rhachis between the four lower and on the opposite side between the four upper anthers. The latter were kidney-shaped and of a brownish-green, with light green bands. Viewed from the side, the spikes appeared to consist of four superimposed cassock-shaped

masses. The female elements were dark green, sessile, and very inconspicuous, but seemed to be six in number in each flower. No perianths were noticed. A couple of days after their appearance on the surface the pollen sacs were found detached and broken, apparently along the outer surfaces, and masses of creamy pollen were lying on the water, some being in contact with the spikes. The pollen grains are about four times as long as broad, more or less angular and rounded, slightly dilated and refractile at the ends and at the knees of the angles. In a day or two after the shedding of the pollen —sometimes before this occurred—the lower parts of the peduncles became convoluted into tangles, eventually drawing the spikes below the surface. (Fig. 2.) (In the "Flora Australiensis" it is stated that the spirally-coiled peduncles bring the spikes *to* the surface, but from our observations the convolutions do not occur until some time afterwards.) The day after the flower-heads have been drawn under they become inverted by the bending of the straight parts of the peduncles, and one was seen actually to suddenly and quickly swing through an arc of about 45°, and soon after through a lesser angle, until it pointed almost vertically downwards at about the level from which it originated. (Fig. 3.) All this time one or more of the carpels from each cluster were growing on lengthening stalks, the others remaining aborted, and in nine days or so had attained the length of about an inch. The carpels are ovoid, brownish, and slightly beaked, and as the stalks lengthened spread out and became separated one from another by an inch or more. Ultimately, about three weeks after fertilization, the stalked fruits, measuring in one instance just on two inches in length (fig. 4), separated and fell, with their stalks, head downwards, into the mud and remained upright. Probably the motion of the water swaying the stalks enables the fruits to penetrate the mud so far that after germination the young plants can effectively root themselves. At a later date it was noticed that the upright stems began to bend and throw out roots from the upper nodes; these roots finally reached the mud, and ultimately drew the stems to a horizontal position some little distance above it. (Figs. 5 and 6.) I am indebted to Mr. J. Searle for photographs of the plant in different stages.

EXPLANATION OF PLATE.

1. Ascending bud.
2. Stem contracted and convoluted.
3. Fruit, with head inverted.
4. Ripe fruits.
5 and 6. Stalk being drawn down by adventitious roots.

PLATE I.

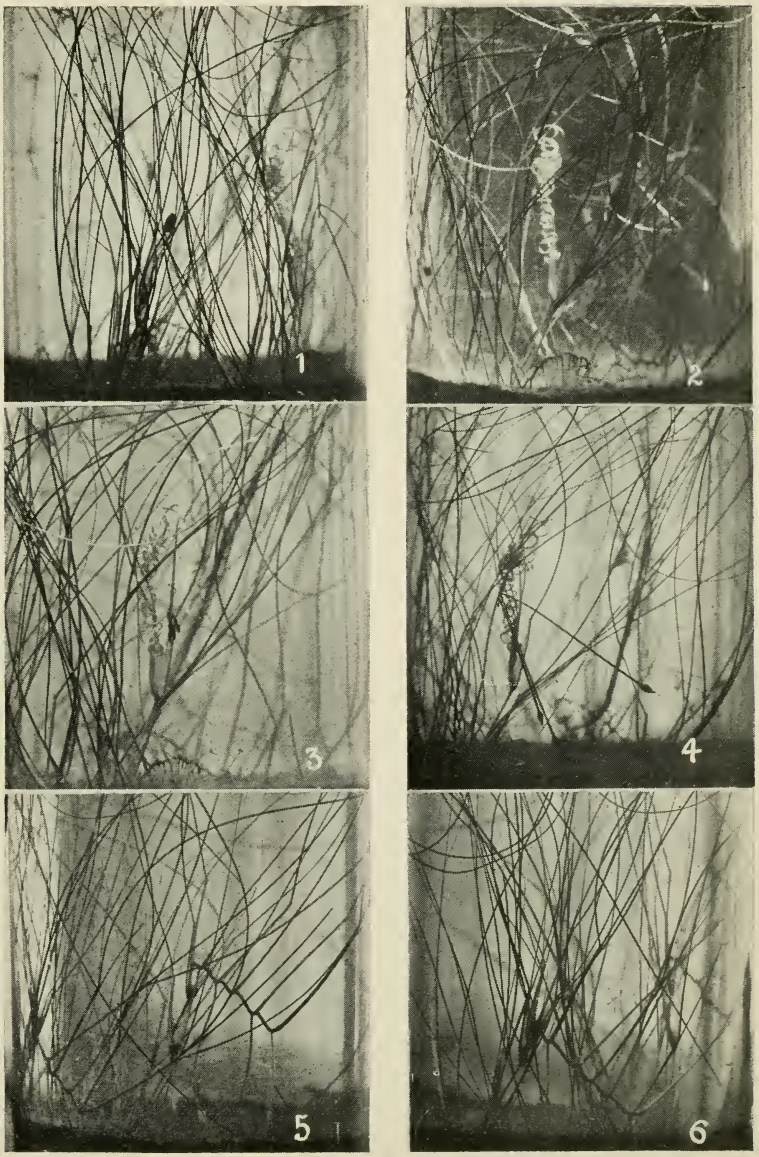

Photo. by J. SEARLE.

STAGES IN THE GROWTH OF THE SEA TASSEL.
RUPPIA MARITIMA, LINN.

THE GLEANINGS OF A CITY NATURALIST.

By J. SEARLE.

(*Read before the Field Naturalists' Club of Victoria, 14th July*, 1919.)

WHEN advocating the claims of natural history as a desirable hobby, one often receives an answer something like this :— "Oh, yes ; it must be a delightful pastime for those who can get out into the country and collect specimens for study, but I am in the office all day, and have no opportunity to engage in such an interesting pursuit." The object of this paper is to show such a city dweller how he may indulge a taste for natural history even if he is "cribb'd, cabin'd, and confin'd" in a city office.

The building in which these notes were written is in the busiest part of Collins-street. My office, on the third floor, is 15 feet by 12 feet, and has two windows facing the north, and overlooking the surrounding roofs and chimneys—as unlikely a collecting-place for nature study specimens as could be imagined ; yet quite a lot of material for study is to be found there from time to time. I have frequently thought of making a list of the various insects, &c., that visit this office in the course of the year, but for some cause or other the project was never carried out in its entirety. But in January of last year I placed a bottle containing spirits of wine on the bench, and specimens of the various objects presently to be described have been captured and placed therein. They consist of Diptera, Coleoptera, Hemiptera, Lepidoptera, Hymenoptera, Arachnidæ, and—would you have thought it possible ?—Crustacea.

Lepidoptera.—The most common specimens of lepidopterous insects that visit a city office are the Tineæ, or clothes moths —a pale yellow coloured species, with burnished scales, at times being rather a nuisance through the havoc its larvæ makes of the baize covering the bases of some instruments, the lining of jewel cases, &c. A frequent visitor is the Bogong Moth, *Agrotis spina*, a sombre-coloured insect with beautiful antennæ. It is a strong flier, but shows very little judgment, dashing into every obstacle to its headlong flight. They hide in dark corners during the day, coming out to enjoy their nocturnal flight as evening advances. At times they invade the city in great numbers. The "Old Lady" Moth, *Dasypoda selenophora*, is occasionally seen resting on the ceiling, and the beautiful little *Cosmodes elegans*, most appropriately named, has been taken. In the months of November and December of last year the city was invaded by swarms of the handsome brown butterfly, *Heteronympha merope*. Numbers of them perished by being trampled on by pedestrians along Collins-

street. The sexes differ so in size and colouring in this insect that by many they were regarded as different species; the larger insect with black markings on the wings is the female. *Pyrameis kershawi*, the "Painted Lady," is another butterfly to be found in the city streets, and occasionally visits the office by way of the open window. The wings and bodies of all moths and butterflies are covered with minute scales, generally placed in rows, and lapping over each other like the slates on a roof; each scale has a short stalk, and they are inserted into little holes or cups in the membrane of the wings. It is these scales that give the wonderful colouring to these beautiful insects. The scales vary in size and shape with the position they occupy on the wings or body of the insect. Some of these scales are ruled with lines of such fineness that at one time they were used by microscopists as test objects in trying the quality of their lenses.

Permanent mounts of the wings and scales may be made in various ways. A small piece of the wing may be placed in a cell and mounted as an opaque object, or samples of the scales may be brushed off various parts of the insect on to a slide; over these a cover glass is placed and the edge cemented with gold size. Another easy and effective mount can be made by placing the wing on a smooth surface and pressing the finger, with a rocking motion, over the selected part of the wing and then repeating the movement on the centre of a 3 x 1 slip. If carefully done the transferred scales will retain their natural position, and may be viewed either as an opaque or transparent object. If the entire head of a small moth be detached from the thorax and mounted on an opaque disc in a deep cell and examined under a low power it will be found to be an object of great beauty. The hemispherical compound eyes of some species have a brilliant metallic lustre, the numerous facets of which they are composed shining like gems. Some of these small moths have feathery antennæ, like beautiful plumes; others just a plain filament. The proboscis of the lepidoptera is an organ of wonderful construction, than which nothing better could be imagined for the purpose for which it is used—extracting honey from the nectaries of flowers. It is composed of two maxillæ, and strengthened by muscular bands. They are convex on the outer side and concave on the inner, and when joined together form a tube through which the nectar is conveyed to the mouth of the insect. When not in use the proboscis is coiled up like the hair-spring of a watch, and hidden between a pair of palps beneath the head.

Coleoptera.—With regard to Coleoptera, the Ptinidæ seem to have a home in our building. They are nocturnal in their

habits. One or two specimens of three or four species are frequently found in the wash-basin of a morning, having fallen in during the night, and, being unable to climb the smooth sides of the basin, remaining captives. Another beetle, *Mezium affine*, is also trapped in the wash-basin ; it has a globular body, of a blood-red colour, perfectly smooth and polished. It has no trace of wings. The thorax, head, legs, and antennæ and the ventral surface of the abdomen are thickly clothed with flattened hairs or scales. The commonest of the Ptinidæ is, I believe, a wood-borer ; it has a slightly flattened oval body, and is covered with long, stout hairs, some straight, others curved. Its legs and beaded antennæ are also hairy. The elytra are fused together, and there are no under wings.

The visitors noted for the year were an occasional elater, or click-beetle, two or three small brown chafers, one large cockchafer, a longicorn, Phoracantha, and others listed at the end of this paper. All of these are worthy of careful study, either as whole insects or the examination of their parts, many of which make fine permanent mounts for microscopical study, such as the antennæ, head and mouth parts, spiracles, eyes, &c. The eye of a beetle is a favourite mount for showing multiple images of objects placed between the mount and the source of light—generally below the iris diaphragm. The larva of one beetle, Anthrenus or Trosoderma, is frequently found in dark corners of drawers. It is an object of special hatred to most entomologists, owing to the havoc it plays if it gets into a collection of insects. It will devour animal matter of any description, even whalebone and tortoiseshell. It is a soft, fat grub about three-sixteenths of an inch in length ; each segment is furnished with a ring of hairs, those on the last two segments being very long and brush-like, and capable of erection "like the quills of the fretful porcupine" when the insect is disturbed. These hairs vary in shape, and are very beautiful objects for the microscope, one form in particular being barbed on the shaft and tipped with an ornament somewhat resembling a closed umbrella. These "umbrella" hairs were a puzzle to naturalists for a considerable time. They were put up as slides by London mounters and labelled "Hairs of Dermestes Beetle," on no species of which beetle could they be found when sought for. Figures of these hairs with their false title are still occasionally seen in books on popular science.

Diptera.—The most numerous of the insects found in a city office belong to the order Diptera, or two-winged flies, and, contrary to what might be expected—notwithstanding the fact (or, perhaps, owing to it), that there is a *café* on the ground floor of the building—*Musca domestica*, the common

house-fly, is only a very occasional visitor. The common yellow blow-fly, *Calliphora villosa*, is far more numerous, and the dark blue one, *C. erythrocephala*, a frequent visitor. When attempt is made to capture these annoying insects, the yellow fly, after buzzing excitedly around the office, attempts to escape through the window-pane, on which it is easily captured and exterminated; but the slower-flying blue insect, *C. erythrocephala*, will invariably fly to some dark corner near the floor or behind some object, and immediately rest there until it thinks the danger is past, when it will again emerge, only to repeat these tactics if again pursued. It may be of interest to note the change in the breeding habits of some of these flies. Formerly they deposited their eggs or larvæ on some dead animal, the "higher" and more "gamey" the better, though not averse at times to a fresh joint of butcher's meat or poultry; but of late years they have developed into a great pest, since they acquired the habit of breeding in the thick greasy fleece of living sheep. Enormous sums of money have been spent, and is still being expended, in trying to eradicate this pest.

When *Musca domestica* visits the office it flies directly to the window, and appears to be as anxious to again leave as I am for it to go. Smaller diptera of elegant forms—many, perhaps, undescribed — are to be seen occasionally on these same windows, and on two occasions immense clouds of very minute flies invaded the city and filled every office. On one occasion, I remember, a building had been newly painted when an invasion of these tiny flies occurred, and in a short time the front of the building was ornamented with millions of these insects, which had stuck to the fresh paint. Mosquitoes and Chironomus are found occasionally, and two or three crane-flies were captured.

The structure of a dipterous insect is very remarkable, and the material collected in my office was sufficient to keep a naturalist busy for many months examining their micro-anatomy. As an example of what the city naturalist may find to interest him in a dipterous insect, we will glance briefly at the anatomy of one of the commonest—the house-fly. In examining a fly we notice at once that it is divided into three parts—the head, thorax, and the abdomen. The head contains the eyes and mouth parts, the thorax the organs of locomotion, and the abdomen the digestive system and the reproductive organs. The head is connected with the thorax by a slender neck that permits it to undergo semi-rotation. We observe that its greater part consists of a pair of hemi-spherical compound eyes, made up of a number of small facets —over 4,000 have been counted; each facet consists of a

lens at the end of a cone, which is lined with a dark pigment and ends in a tiny nervelet. All these unite into one large nerve, connected with the ganglia or brain. In addition to these compound eyes the fly has three small ocelli, or simple eyes, placed in a triangle on the top of the head. The width of the space on the top of the head between the eyes is greater in the female than in the male. In the front of the head is placed the antennæ, which are the principal means of classifying flies ; they are composed of four joints, the third of which is very much enlarged. That these are sense organs there can be no doubt, though whether of touch, hearing, or smell it is not possible to definitely say. The first three joints fit into a recess, and are generally out of sight, only the plumose end, the arista, being visible. Microscopic examination of the enlarged third joint reveals the fact that it is covered all over with little sacs or cells closed by a membranous covering. At the base of the joint are a few larger apertures which lead into cavities furnished at the bottom with hairs. Now, it is quite clear that these latter structures have to do with some sort of sensation, since each cavity is connected with the brain by a fine nerve. From their general analogy to the ear of higher animals, and by comparing their form in different kinds of insects, it has been inferred that they are organs of hearing ; probably they are endowed with a special sense of which we mortals know not. Situated on the under side of the head is the extensible proboscis. It is adapted for the absorption of fluid food. It tapers slightly from above downwards, and consists of three parts. First, a truncated, cone-shaped portion, called the rostrum, attached to the under side of the head ; to the front of the rostrum is attached a pair of palps. The second and lower half of the proboscis, which is called the transtellum or proboscis proper, is narrower. On the front of this portion is hinged a narrow triangular appendage called the labium-epipharynx ; it covers a groove in which a hollow, stylet-like tongue or hypo-pharynx lies. The proboscis is terminated by the oral disc, or sucker, which consists of a pair of lobes or labella, which, when distended, form an oval structure, the two halves being united by a bead and groove joint. The surface of each labella is traversed by about 36 small canals, the channels of which are kept open by small, incomplete rings. Between these canals, which are called pseudo-tracheæ, on account of their ringed appearance, there are a number of nipple-like openings, which are probably gustatory sense-organs. The pseudo-tracheæ converge into a small oral pit. When a fly alights, say, on a lump of sugar, you will see the proboscis protruded, when the tip will unfold into two broad, fan-like leaflets. A small portion of the sugar

is grated off by the teeth and dissolved by a salival fluid which the fly pours upon it from its salivary ducts, and then the sweet solution is sucked back again. When the food is first swallowed it passes into a crop or sucking stomach. But it does not remain there very long. It is soon brought back again and is swallowed once more. This time it goes down the alimentary tube proper, and flows on till it arrives at the spherical-shaped proventriculus, which has sometimes been described as a gizzard. The proventriculus is capable of being closed during the early part of a meal, in order that the food may not enter the intestine, but pass into the crop. It also opens when it is necessary to allow material to pass into the intestines. These observations, made by Graham-Smith, seem to indicate that the proventriculus acts as a valve, and not, as stated by Lowne, "a gizzard and nothing more." The long vessel called the ventriculus is the true digesting stomach. This tapers off into a coiled intestine, and ending in the rectum, or receptacle for waste material.

In the second of the chief divisions—the thorax—we find ourselves able to gain a better conception of the shape of these smaller segments, joints, or rings which are the final subdivisions of the bodies of insects. If the middle part of the thorax be examined there will plainly be seen all the parts of which an insect segment can consist. On the upper surface is the dorsal plate, at the sides two lateral plates, and underneath the ventral plate. The openings at the top show where the wings are attached, while beneath are the attachments of one pair of legs. The wings are made up of a double membrane, and are, in fact, a kind of flattened bag or sac, which is strengthened at places by folds called veins or nervures, and the areas between are called cells. The main veins run longitudinally from base to the top of the wing, but there are some cross veins. The differences in the arrangement of the veins afford ready means of distinguishing *M. domestica* from other flies often found in houses. On the hind margin of the wing, near the base, there is a more or less free lobe called the alula. Internal to the posterior lobule of the wing are placed smaller membranous plates known as squama and antisquama. The squama is thicker than the rest of the wing, and is attached posteriorly to the wing-root. Possibly these facilitate the opening and closing of the wings. Behind the wings the pair of halteres—commonly called balancers or poisers—is placed, the most characteristic of all dipterous structures. They are believed to be the homologues of the hind pair of wings, though their exact functions are far from clear. Each consists of a conical base provided with a number of sense organs; on this base is mounted a slender rod; at the

end a small hemispherical knob is attached. They are provided with muscles at the base, and can, like the wings, execute most rapid vibrations. The squama covers the halter like a hood. A typical insect has three pairs of legs, which are attached to the thorax. Each leg consists of five parts—the coxa, trochanter, femur, tibia, and tarsus or foot. In the case of the fly this foot is subdivided into five joints. It is furnished with a pair of formidable claws, and between them a pair of membranous pads or pulvilli. The pulvilli are covered on their ventral surfaces with innumerable closely-set secretory hairs, from which a sticky fluid is given out, and this enables the foot to adhere to any slippery surface over which the fly is walking. By means of the claws the insect is enabled to cling to the little irregularities of the ceiling when walking upside down. As may be expected from the attachment of the wings and legs, we, of course, find within the thorax a highly-developed set of rapidly contracting muscles. The resulting movements have this further significance: that they help in the respiratory exchange of gases and in the circulation of the blood.

The respiratory or tracheal system of the fly is very highly developed. Altogether, it occupies more space in the body of the fly than any other set of organs. It consists of three parts: the spiracles, or breathing pores, situated at the sides of the body; air-sacs, and air-tubes (or tracheæ). A large pair of spiracles is situated on the bases of the first pair of legs. Above and behind the bases of the last pair of legs is another pair of spiracles, and, in addition to these thoracic there are a number of pairs of spiracles at the sides of the abdominal segments. All these spiracles communicate with tracheæ which ramify among the various organs of the fly's anatomy. The abdomen or hindermost division of the body is composed of several segments—eight in the male and nine in the female. The segments succeeding the fifth are greatly reduced in the male, and in the female form the tubular ovipositor, which, in repose, is telescoped within the abdomen. The blood system of the fly is simple. The body cavity forms a blood cavity, so that all the organs and muscles are bathed in the blood fluid, which is colourless, and contains fatty corpuscles. There is a muscular tube, a heart, lying in a cavity immediately under the dorsal side of the abdomen. It extends from the posterior end to the anterior end of the abdomen, and is divided into four chambers, each having a pair of openings into which the blood is sucked, so to speak, from the pericardial cavity. If it is in the warmer months of the year that we are making our dissection, and the fly happens to be a female one, the abdomen will be found practically filled

with white cylindrical eggs, closely packed together in two large bundles. Each of these bundles, which are the enlarged ovaries, contains about 70 strings of eggs in various stages of development, and the ovaries open into two ducts which join together to form a central oviduct opening into the telescopic ovipositor.

The mosquito also is worthy of minute examination. The wings, covered with handsome scales, the halteres, legs, and tarsi display their structure wonderfully well, while a well-mounted head and mouth parts is worthy of a place in any cabinet of slides. In the mosquito—as is sometimes the case with a higher order of animals—it is the female that is the cause of all the trouble. It is she that has developed the habit of sucking blood from living animals, the male contenting himself with a vegetable diet, from which, some naturalists say, he never departs. I am sorry to throw doubt on such a good reputation, but truth compels me to state that I have undoubted proof of a male mosquito of the genus Stegomyia sucking human blood. If the head of a female mosquito is placed in dilute liquor potassa for an hour or two, then washed in warm water until all the potash is removed, it can be placed on a glass slip, and with a couple of needles mounted in handles the mouth parts can be drawn from their sheath and carefully displayed on the slip. It is then covered with another slip, taking care not to disarrange the parts, and dehydrated in alcohol, cleared in clove oil or cajaput, and mounted in balsam. The largest of the mouth parts is the labrum or tongue. Slightly smaller than the labrum is the labium, which forms a sheath for the maxillæ and mandibles, four in number. Two of them are sharp-pointed and are used for piercing; the other two are armed with fine serrations, which are used, probably, to enlarge the wound made by the lancets. At either side of the tongue are the maxillary palps, and outside these are the antennæ. The rest of the head is taken up with the two hemispherical compound eyes. The same mouth parts, but less highly developed, are found in the male, but his antennæ are most beautifully plumose. It has been stated that the use of these beautiful appendages is to guide him to the female. Experiment has proved that when a high note is sounded, of the same pitch as that produced by the female mosquito, the setæ on the antennæ of the male, pointing in the direction of the sound, vibrate in unison with it. It is asserted that the buzzing of the female mosquito causes certain of the setæ on the antennæ of the male to vibrate. The male then flies in the direction from whence the vibrations come, and is so led to the presence of the female.

Hymenoptera.—The Hymenoptera is represented by two

specimens each of wasps and ichneumon flies. The usual habitat of one of the wasps—blue in colour and of sturdy build—is a sandy paddock or heathy patch. What spirit of adventure led him to visit the top floor of a city building it is impossible to say; but, like many another who left rural delights for the lure of the city, alcohol and the bottle ended his career. Attention may be drawn to two objects in Vespian structure. When the insect is at rest, the wings, of which there are four, lie horizontally upon the body. If we examine the hinder wings we will see a row of small hooks on the upper or outer edge of the wing. We will also notice a fold along the inner edge of the fore wing. The use of these structures is at once apparent when the insect raises its wings for flight. As the fore wings pass over the posterior ones the hooks on the latter engage with the fold on the fore wing, securely locking the two together and adding to their efficiency as an organ of flight. The sting may be regarded as a modified form of ovipositor. The piercing lancets are encased in a sheath, which seems to act as a director and also to keep the fine lancets from bending when the powerful muscles with which they are furnished are applied to drive them into the object attacked. A duct conveys poison from the gland to the lancets, and is by them deposited in the wound they inflict. Unlike the bee, the wasp does not lose its weapon of defence.

Arachnidæ.—Spiders of various species are frequently found in the city offices. The small money-spider appears to be a life tenant, and is to be found in all sorts of places—in boxes and drawers, and even in the steel safe. What it finds in the way of food I cannot tell. It will suddenly appear from nowhere, race across the bench or desk, taking cover from every object it comes in contact with, and finally disappear again as mysteriously as it made its appearance. The slight web of another species is sometimes found between the wall and a nest of drawers, should the latter be shifted. The other spiders are simply "strays," but all make interesting objects for study. The cephalothorax of the money-spiders varies in a remarkable manner, and takes on all sorts of peculiar shapes. Most spiders are furnished with eight eyes, generally arranged in two rows across the cephalothorax. Systematists make use of the eyes of spiders in determining species. The number may be reduced to six, four, or even two only. They vary in colour and shape as well as number. The feet, with their claws and combs, falces or jaws, the spinnerettes, are all of interest, but the most remarkable organ is, perhaps, the lung-book, which seems to point to the relationship between the spiders and the crustaceans. We saw, when examining some of the insects, that they breathe by means of spiracles opening

directly into tracheæ which ramify through the insect's body. The respiratory organ of a spider is different, inasmuch as the pulmonary stigma leads into cavities which are practically filled with plates attached at the front and sides, but having their posterior edges free. These plates are the leaves of the so-called lung-book. Each leaf is hollow, and its cavity is continuous with the blood sinus, into which the blood from various parts of the spider's body is poured. There are similar gill-books in the king crab, Limulus, into which the blood enters, while, externally, the water carrying oxygen in solution circulates between the leaves.

Crustacea.—When I mentioned crustacea as a visitor to a city office, some of you, perhaps, had visions of a "cray and chips" supper; but the crustacean I captured was a living Isopod—one of the wood-lice, or slaters. I cannot account for its presence otherwise than from the fact that my neighbour uses pot plants for decorative purposes, and the stray Isopod, thus, perhaps, introduced into the building, wandered into my office.

These notes might have been extended to a much greater length, but as they are I think they are sufficient to show that even in a city office there is plenty of material to engage the attention of anyone with a love for natural history if they care to use their eyes, and there is nothing to deter the city dweller from taking up this delightful and intellectual recreation and enjoying the pleasure to be derived from it.

In putting these notes together free use has been made of "House-Flies," by C. G. Hewitt, D.Sc.; "Flies in Relation to Disease," by G. S. Graham-Smith, M.D.; "The Cambridge Natural History," &c., but the facts stated therein have been checked wherever possible by observation and dissection.

The dissections so made, and from which the photo-micrographs illustrating the paper have been made, are on exhibition under the microscope this evening.

The following is a list of the insects noted during the last six months:—

Lepidoptera: Heteronympha merope, Pyrameis kershawi, Dasypodia selenophora, Agrotis spina, A. infusa, Cosmodes elegans, Tineus (sp.) Coleoptera: Anoplognathus velutinus, Phoracantha (sp.), Tenebrio molitor, Elater (sp.), Mezium affine, Trosoderma froggatti, Quodius fulgidus, Attagenus pallens, Doretaphrus bakewelli, Ptinus fur, Silodrepa paniceum. Diptera: Calliphora villosa, C. erythrocephala, Pollenia stygia, Unastellorhina dorsalis, Pycnosoma rubifacies, Limnophila (sp.), Trimacra (sp.), Chironomus (sp.), Stegonica (sp.), Culex (sp.) Hymenoptera: Campsomeris anthracina, Ichneuminida (sp.) Hemiptera: Nasius vestitis; with others not identified.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th September, 1919.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about fifty members and visitors were present.

CORRESPONDENCE.

From the "R. M. Johnston Memorial Fund" Committee, Hobart, soliciting subscriptions to the fund being raised to commemorate the memory of the late Mr. R. M. Johnston, I.S.O., F.L.S., Government Geologist of Tasmania, and one of the foremost workers for natural science in that State. Subscriptions will be gladly received by the hon. sec., Mr. Clive Lord, Tasmanian Museum, Hobart.

REPORTS.

A report of the excursion to Cheltenham on Saturday, 23rd August, was given by the leader, Dr. C. S. Sutton, who said that there had been a good attendance of members, who were favoured by a bright afternoon. The party visited the area in the neighbourhood of "The Springs," but found few flowers of note, owing to the fact that the scrub had been burned some months before, and the new growth had not become sufficiently established to provide the floral wealth for which the district is celebrated; but later in the season it would doubtless be worth visiting. Owing to the absence of Mr. J. Searle, the pond-life results of the excursion were not commented on. Dr. Sutton and others deplored the rapid extension of building in the Cheltenham and Sandringham districts and the consequent extinction of the most prolific and interesting flora near Melbourne, and regretted that no public park had been set aside so that future generations might have some idea of what our heath lands had been. In this connection mention was made of the recent gift by Mr. Theodore Napier, of "Magdala," North Essendon, of a considerable area of well-wooded land to the Essendon City Council for the purposes of a public park, on condition that none of the original trees be disturbed. On the motion of Messrs. F. G. A. Barnard and F. Keep, it was resolved to forward a letter to Mr. Napier, informing him of the Club's appreciation of his action.

A report of the excursion to Ringwood on Saturday, 30th August, was given by the leader, Mr. F. G. A. Barnard, who said that the large party was favoured by a delightful afternoon. Taking a different route than usual, the Dandenong Creek was reached by way of the Wantirna-road in about two

miles. Some uncultivated ground was traversed on the way, where many of the usual spring flowers were noticed, *Acacia myrtifolia* being particularly fine. A few early orchids, such as *Caladenia carnea* and *Diuris maculata*, were fairly common. At the creek were some nice young trees of the Silver Wattle, *Acacia dealbata*, well covered with blossoms. The return journey was made mostly through uncleared paddocks, where numerous other flowers were added to the collections. The best find of the day was a plant of *Hovea heterophylla* bearing white flowers instead of the usual lilac, this reversion to albinism on the part of *H. heterophylla* being of very unusual occurrence. Some discussion followed on the subject of albinism and reversion from type in flowers, the chairman mentioning that he had recently had sent to him a flower of Early Nancy, *Wurmbea dioica*, which was of a purple colour instead of the usual white. Mr. J. Booth suggested that the alteration in colour might be due to the presence of iron in the soil. Mr. Hardy said that this was perhaps the reason, for the ground where the flower had been picked was littered with disused portions of machinery, all of which were encrusted with rust. Mr. H. B. Williamson mentioned that a white specimen of the Common Centaury, *Erythræa australis*, had recently been forwarded to him, which he considered very unusual. Mr. P. C. Morrison said that last spring he found a cream-coloured Spider Orchid at Ringwood. In this case he considered the lack of colour was due to the situation in which the plant was growing being deficient in sunlight.

GENERAL BUSINESS.

Mr. C. L. Barrett, C.M.Z.S., referred to the intention to devote portion of the proceeds of the forthcoming exhibition of wild-flowers to the publication of a list of common names for Victorian plants, and asked whether the idea was a bare list or something in the way of an informative booklet giving hints for the recognition of the flowers.

Dr. Sutton said that details of the proposed publication had not yet been worked out by the Plant Names Committee. In any case it would be impossible to bring out a book whereby anyone not acquainted with botany could accurately ascertain the species of any wild-flower he might come across.

Mr. F. Keep suggested that at any rate a column giving the usual colour of the flower might be included.

Mr. Barrett said that something popular was badly needed, and that a botany along the lines of Dr. Leach's "Australian Bird Book" would pay for itself many times over if introduced into the schools.

Mr. C. C. Plante concurred with Mr. Barrett's remarks, saying that at present, unless one were a botanist, or devoted the whole of his spare time to plant study, it was impossible to recognize

with any certainty even a very few native flowers, owing to the want of a non-technical guide on the subject.

Mr. F. G. A. Barnard pointed out that there could be no comparison between a bird book and a botany, as the whole list of Australian birds numbered only some 400 species, while a botany for Victoria alone would enumerate over 2,000 species, and for Australia over 8,000. The latter would be too great a task for any one society to undertake. He saw great difficulties in the way of simple, brief descriptions, because so many of our genera comprised species of greatly diverse characters.

Mr. H. B. Williamson supported Mr. Barnard, and pointed out the impossibility of the determination of some species, and even genera, in the field, or by the tyro, taking for example the Dillwynias, Pultenæas, and Daviesias, which require dissection and microscopical examination to definitely distinguish between them.

Mr. J. A. Kershaw said that illustrations were of primary importance if the list was to be of any service.

Mr. F. Pitcher suggested that the matter be left in the hands of the Plant Names Committee for consideration at its next meeting, and moved to that effect. He mentioned that, with regard to illustrations, Mr. E. E. Pescott's work, "The Native Flowers of Victoria," contained a large number of illustrations, and seemed to him to be suitable for the purpose.

Mr. Barnard asked to be allowed to speak again, and said that, as the originator of the suggestion of common names for our plants, which he had made in a paper read before the Club some ten or twelve years before (see *Victorian Naturalist*, vol. xxiii., p. 136), he then had no idea of naming more than the more prominent species to be found in certain areas; but the committee had thought it desirable to include every Victorian species.

The chairman said that whatever was done should be done quickly, for if any other work of a similar nature should come out before that of the Club the chance of making the publication a success would be greatly lessened.

On being put to the meeting, Mr. Pitcher's motion was carried unanimously.

PAPER.

By Mr. A. H. S. Lucas, M.A., B.Sc. (hon. member), entitled "Ferns Grown in the Open."

The paper was read by Mr. F. G. A. Barnard, and detailed the methods adopted by the author, who is a resident of Gordon, one of the northern suburbs of Sydney, to grow his favourites in as nearly as possible natural conditions, unsheltered by covering of any description. He found that, while some species suffered to some extent during the summer, though copiously watered, nearly all recovered when cooler weather came, while

many species, so long as the watering was not forgotten, seemed to revel in the conditions provided.

Mr. F. Pitcher, in congratulating the author on the interest of his notes, expressed surprise that more had not been done in the way described. He could name twenty Victorian ferns which are quite easily cultivated in the open so long as they are sheltered from the north winds. Regarding tree ferns, he advised the use of the Alsophila in preference to the Dicksonia for outdoor situations, and said that in most gardens tall tree-ferns are out of place—that rather ones with stems not more than two feet high should be selected.

Mr. J. Gabriel complained of the destruction of tree-ferns in the Dandenong Ranges, Perrin's Gully, which was the show place of the district, being now a mere wreck of what it was.

Mr. J. Stickland considered the paper an excellent one, but would have liked to hear how the author dealt with the slug pest. He said the best growth he had had of a tree-fern was from a piece about two feet long sawn from the top of a tall specimen.

Mr. F. G. A. Barnard said the paper was a most interesting one. He had been surprised at the large number of ferns mentioned. He could not understand the difficulty the author met with in growing the King Fern, *Todea barbara*, for here it was readily grown as a pot plant.

Mr. A. D. Hardy said that, sheltered from the hot north wind, he had grown several species in the open very successfully.

2. By Mr. J. C. Goudie, entitled "Notes on the Coleoptera of North-Western Victoria," Part VII.

In this part the author recorded about sixty species belonging to the families Cucujidæ, Cryptophagidæ, Lathrididæ, Dermestidæ, Byrrhidæ, Heteroceridæ, Lucanidæ, Scarabæidæ, and sub-family Cetonides, many of which are found only in that portion of Victoria.

Owing to the lateness of the hour, the paper was taken as read.

EXHIBITS.

By Mr. F. Keep.—Flowering specimens of *Acacia cardiophylla* and *A. buxifolia*, grown at Camberwell; also dried specimens of *Hovea heterophylla*, and white variety collected at Ringwood excursion by Miss Carter.

By Miss M. T. Johnson.—Seeds of Mahogany Bean, *Afzelia Africana*, from South Africa.

By Miss G. Nethercote.—Flowering specimens of *Boronia anemonifolia*, A. Cunn., from Bendigo.

[Several other members exhibited specimens, but omitted to hand in particulars.]

After the usual conversazione the meeting terminated.

THE BIRDS OF A GIPPSLAND GARDEN.

By (Miss) C. C. CURRIE, Lardner.

(*Read before the Field Naturalists' Club of Victoria, 11th Aug.*, 1919.)

NESTLED close in the shelter of the tall timber and original bush, this garden is crowded with English and native trees, shrubs, and tree-ferns, which makes it a perfect shelter for many kinds of birds.

With a well-stocked larder beside it, a young Boobook Owl, *Ninox boobook*, sits in the shadiest part until its parents return in the evening. Of Honey-eaters we have not a few. The Spinebills, *Acanthorhynchus tenuirostris*, rarely leave the garden. They are old favourites, and depend upon us to help them in the continual feud with the Wattle-birds, who question their right to the garden.

The flowering eucalypts are doubtless responsible for so many Honey-eaters. The Wattle-birds, *Acanthochæra carunculata*, had their nest in a Western Australian *E. calophylla*, over a gate, so they are not shy. The Tawny-crowned Honey-eater, *Glyciphila melanops*, lives amongst some banksia trees about a mile away, and visits us from time to time. The Brush Wattle-bird, *Anellobia chrysoptera*, is a particularly noisy visitor, mimicking a great many birds, and is known in many parts as the "Mocking-bird." Another visitor, the White-eared Honey-eater, *Ptilotis leucotis*, is particularly quiet, though not at all shy, and flits gracefully through the plum-tree at the door, his taste for plums fully equalling his taste for flowers.

To-day I hear a Bell-Miner, *Manorhina melanophrys*. There is a colony of these birds about three miles away, and occasionally we hear one in the tall timber near the house, and hope he will stay. A very great favourite is the White-shafted Flycatcher, or Fantail, *Rhipidura albiscapa*. It often flies in at the house door catching flies, regardless of our presence. A pair have their nest in a tea shrub, *Thea sinensis*, in the flower garden, where three young were reared in the tiny nest, while the incomparable nest of the Black-and-White Fantail, *R. motacilloides*, is in a gum-tree just outside the garden fence, and in the same tree, a few feet above it, is a Mud-Lark's (*Grallina picata*) nest. Near by there are several more Mud-Larks' nests. The birds are great friends since one season we shot a Magpie which had destroyed six nests, one after the other, as the Mud-Larks built them, throwing the eggs out. The Grallinas used to shriek each time, but we were always too late to save the nest.

Welcome Swallows, *Chelidon neoxena*, are here all the year round. They nest in the barn, and it is interesting to note

that on very hot days they throw their young out of the nests when the iron roof gets too hot. Fortunately for them, we know of this action, and in the evening look for the birds and replace them, or the cat would account for them.

The Mountain Thrush, *Oreocincla lunulata*, is very shy as it runs about quickly in the garden in its search for acacia seeds, slipping out of sight on the approach of footsteps. One feels anxious for the bird when cats are about. The Harmonious Thrush or Grey Shrike-Thrush, *Colluricincla harmonica*, delights in the scraps we give him, and which he takes away to a splintery log to hold them while he picks them to pieces.

In the bush, not a minute's walk from the house, are the Spotted Ground-Bird, *Cinclosoma punctatum*, and the Whip-bird, *Psophodes crepitans*. The latter are to be seen to great advantage on an evening after rain has been falling and all the bush is damp. One evening four were to be seen ; the hen bird scolded me while her mate was cracking his whip, while two smaller ones were hopping along the path before me. Then she finished up his "crack" in fine style, but I think he manages it alone sometimes.

That dear little favourite, the Superb Warbler or Blue Wren, *Malurus cyanochlamys*, marshals his family around the garden, and it is very ridiculous to see a pair respond to the shrieks of a great lazy Bronze-Cuckoo, *Chalcococcyx plagosus*, which they have reared in the garden. The Fantail Cuckoo, *Cacomantis rufulus*, was seen for a few days only ; we suspected the Spine-bills were responsible for its rearing. The Pallid Cuckoo, *Cuculus inornatus*, can be heard uttering its plaintive notes a little further afield.

With the Wrens there sometimes comes quite a flock of small birds to the garden, such as the Shrike-Robin, *Eopsaltria australis*, Fire-tailed Finch, *Ægintha temporalis*, and the Little Tit-Warbler, *Acanthiza nana*. Out in the fields in front the White-fronted Chats, *Ephthianura albifrons*, have their nest amongst a patch of bracken, and a little away is the Goldfinches' first nest of the season, the second being in an apple-tree in the garden.

Lovely to watch is the Nankeen Kestrel, *Cerchneis cenchroides*, circling round over the grassy fields during the high east wind. The Pipit, *Anthus australis*, which runs among the grass, and a brace or two of Quail, *Synoicus australis*, are in danger from the destructive desires of this inhabitant of the air. The Little Falcon, *Falco lunulatus*, keeps the Rosella Parrots, *Platycercus eximius*, active in their efforts to keep out of the way, while a pair of Allied Harriers or Swamp Hawks, *Circus gouldi*, work over the swamp, and go home to where they nest, about six miles away, every evening.

That handsome bird, the Crimson Parrot, *Platycercus elegans*, known also as Pennant's Parrakeet and Red Lory, sits upon the wheat-stack all day long, one now and again falling a victim to the cat. The red-plumaged (adult) birds are far more wary than the younger green-plumaged ones, and fly across in numbers. In the garden the Gang-Gang Cockatoos, *Callocephalon galeatum*, come and search for acacia seeds and bright berries, and later in the year share with the Spotted Bower-Birds, *Chlamydera maculata*, the holly berries.

A flock of White-eyes, *Zosterops cœrulescens*, remember us while the mulberries and sweet plums are ripening. White-browed Wood-Swallows, *Artamus superciliosus*, or Summer-birds, are at home round a small spinney, and Starlings attend to the grasshopper pest, while Crows occasionally fly over at this season. A Rufous Flycatcher, *Rhipidura rufifrons*, paid us a visit also, but was very shy.

While the flax is being loaded a Kookaburra, *Dacelo gigas*, or Great Brown Kingfisher, balances himself on an extra fork handle, and swoops down from time to time when he sees a mouse, never failing to secure it. In the bush alongside Thickheads, *Pachycephala rufiventris*, and Tree-creepers, *Climacteris picumna* (brown) and *C. scandens* (White-throated), are to be seen, sometimes even on the posts supporting the barn.

The Bronzewing Pigeon, *Phaps chalcoptera*, is also (though rarely) a visitor to the garden, where it searches for wattle seeds. We know its haunt, which is on our way to the swamp, not more than ten minutes' walk away, where there is a colony of Emu-Wrens, *Stipiturus malachurus*, numbering about twenty —such dear little birds, with such ridiculously long tail feathers. From there we go on to see the White-fronted Heron, otherwise Blue Crane, *Notophoyx novæ-hollandiæ*, of which, during last February and March, there were ten to be seen.

We have been delighted to have all these birds about us at one time. Soon some will leave us, while others—the Robins, the Bower-birds, and the Gang-Gangs—will come and steal the holly berries; but all are sure of a welcome and protection in this sanctuary of a Gippsland bush garden.

Miss C. C. Currie, being a country member of the Club, and unable to be present at many ordinary meetings, was afforded the opportunity of replying to the criticism on her paper as recorded on pages 66–67 of the September *Naturalist*. She writes :—

" I would like to say, in reply to the criticism on my paper

in the last *Naturalist*, that all the birds mentioned in my paper were seen during February and March of the present year. There is no mistake as to the presence of the Bell-Miner. On a previous occasion we had observed them at a distance of not more than twelve feet, and had passed the field-glasses back and forth from one to the other while doing so. Furthermore, we have been used to these birds all our lives. Though they did leave the district when the swamps were cleared, they returned some years ago from the timber further back. As regards the Mountain-Thrush, Mr. Wilson is correct; I don't know how I made such a silly mistake as to write 'acacia seeds' for 'insects.' I must have been thinking of something else at the time. Lovers of nature, spending their lives among birds which come around them, have a great advantage over students of ornithology who make occasional visits to localities where birds are plentiful to study their habits, which generally ends in shooting the birds to make skins for their collections, or to make sure of its identity by counting its feathers. Thus, with the Bell-Miner, if we had shot the prospector we would never have had a colony established here as we desired. With reference to the mimicry by the Brush Wattle-bird, we fully expected to see a Starling when we went to look whence the bird-notes came, because the Starling's note was among those heard. Others were the Black-faced Cuckoo-Shrike, the Grallina, and a Parrot. There was no doubt as to which was the guilty bird, for he was perched on the top of a lemon-scented gum in full view of our field-glasses, and was in no wise disturbed by my sister calling me to see him. Many differences of opinion regarding birds depend on the nature of the observer, and only persons who live their lives among birds, and take particular notice of their ways, get the opportunities to record remarkable facts. For instance, the Grallina never adds mud to its nest after 10 o'clock each morning, no matter how fine the day is. How does the bird know when it is ten o'clock? Though we would be delighted to have a visit from a party of bird-lovers, we fear the distance is rather too much for one day. Besides, we do not like the birds disturbed, and, of course, could not allow any collecting."

CORRECTION.—In the report of the August meeting in the September *Naturalist* the locality of the fossil marine shells exhibited by Mr. H. B. Williamson is wrongly given on pages 66 and 68 as "Croydon"; it should be "the Abattoirs," a new locality for this deposit, and about five miles north-easterly from the Croydon bore.

FERNS GROWN IN THE OPEN.

By A. H. S. Lucas, M.A., B.Sc. (Hon. Member).

(*Read before the Field Naturalists' Club of Victoria, 8th Sept.*, 1919.)

The monsoonal rains are now falling, and the long drought and scorching days are over; so we can take stock of the damage and see how our ferns have stood the long time of severe trial.

Probably many members of the Club have grown ferns under the friendly shade of the bush-house, and by ordinary care have brought their favourites safely through the summer. They may be interested in the experiment of growing these plants out in the open and a few degrees nearer the equator.

The situation of my house is at Gordon, on the line between Milson's Point and Hornsby, about 8 miles from the first-named station, and 380 feet above sea-level. During 1918 I converted a part of my ground still occupied by gum-trees and native bushes into an open-air fernery. The plot is well sheltered, especially from the westerly winds—with us sometimes red-hot in summer and icy cold in winter. It is practically untouched by frosts, and shaded by trees from the morning sun, but fully exposed to its mid-day rays.

It was divided up into a number of *quasi*-rockeries. Stone is abundant in the heads of the gullies near the house. The ground of each was worked up, a guard wall of large stones built around it, and the space filled up nearly to the level of the stones with leaf-mould, light earth, charcoal, and small bits of sandstone and a little manure. On this, a foot or so within the outer wall, another similar wall of smaller radius was built, and the ground formed as before. Mostly I stopped here, but the largest and most central bed—a circular one—had three concentric zones around the central elevated circle. The topmost bed of this was occupied by a large Bird's Nest Fern. One of the zones was filled up entirely with Maiden Hair Fern, *Adiantum æthiopicum*, which grows wild in our neighbourhood. The other zones and all the other beds were filled rather closely with ferns, with a few mosses and liverworts in between them. Visits to Illawarra, the Kurrajong, and the Blue Mountains provided most of the plants, and no place knew that it had been robbed. A hose was available for watering, and this was necessary most evenings in the hot, dry summer.

Very few indeed of the ferns have died right down, though a good many began to look brown in patches. Among the tenderest seemed to be the Lindsayas. *L. microphylla*, the most beautiful, is very hard to keep, though sheltered among

stones and protected by a bark roof over its nook. It grows in deep, extremely sandy, loose soil under or at the foot of big rocks in our sandstone gullies, where it does not seem to get much nutriment, but is kept moist by its situation. It is not easy to devise means to provide for it sufficient moisture and shade away from the seepage of the gully sides. One group of plants has survived, but the other has disappeared. It can be grown well in a glass frame. *L. trichomanoides*, growing in good soil in deep gullies, also seems to resent the excess of light of the lowlands. We are here about 400 feet above sea level, but I obtained it growing wild in the Kurrajong at 2,000 feet. Even *L. linearis*, common in swampy heaths, is a little difficult. It has long, thin rhizomes, which must be very carefully transferred. The plants, however, after foxing in the summer, are now coming on well.

The Adiantums have done splendidly. *A. æthiopicum* always withers off the old fronds in the summer, but young ones replace them, and the plants now make a bright green girdle round the throne of the Birds' Nest. *A. formosum* never turned a hair, but has grown so fast and so big as to threaten its neighbours ; it runs rapidly. *A. affine* is much more tricky ; has just held its own, without much more to boast of. *A. hispidulum* is more delicate, but, planted in sheltered nooks, is bright and green, as is also its ally, *A. neo-caledonicum*, obtained in the markets. It is a more dwarf and bushy fern, and does not need so much shelter. Both large-segmented forms of *A. capillus-veneris* and small-segmented forms of other imported species surprised me by flourishing much better in the open than they had done in the bush-house. They all seem to revel in the freedom allowed to their rhizomes.

Doodia aspera and *D. caudata*, both common in this district, just rioted in the good water supply. They go off in the bush in a drought, but with plenty of water defy heat or wind. Growing with these two we sometimes find a form which seems to be identical with the *D. connexa* of Kunze. It resembles *D. aspera* in the size and shape of the frond and pinnæ, but most of these are detached, as in *D. caudata*, and the sori are more like those of *D. caudata*. As the two species grow in company with this form, it may be a hybrid between them. It is as hardy as they. Under the shelter of the big Crow's Nest in the central bed grows a plant of *D. Atkinsoniæ*, which is usually considered a variety of *D. caudata*. The fronds are exceedingly variable, taking all shapes in the lower part, but nearly all end in tails, which may reach a foot or more in length. It is a descendant—or rather derivative—of a plant gathered in the Kurrajong, on the spot where Miss Atkinson noted it. It is so rare that, if a variety, it must have been a

"sport." It has maintained its characters with me for about nine years.

Blechnum cartilagineum is a local fern, and naturally very hardy, but in the bush it always shows the effect of the summer, and many of its fronds wilt. It makes up for this by the delicate reddish-purple of the young fronds. My plants, though not in special soil, fared better than those in the bush. *B. serrulatum* is a swamp plant, with creeping underground rhizome ; it has responded well to the good soil and good water supply. It is a little slow in starting after it is shifted, but once it takes hold it goes ahead consistently. *B. lævigatum* is referred to below.

The allies of Blechnum, the Lomarias—(N.B.—I have not employed Christensen's classification, because I thought that the old names as given by Bentham would be more familiar to fern-growers) — have been very unequal in their heat-resisting powers. *L. Patersoni*, growing wild by creeks in deep gullies, came off rather badly, losing most fronds completely and having the residue half-withered. The plants show signs now of recovery. It is very tender in the matter of shifting, likely looking young plants with a bole of earth enclosing their roots going back for a time without any apparent reason. They seem to be very shy of new soil. *L. lanceolata* is quite hardy, even fairly large plants soon recovering after transplanting. The young plants, put in a year ago, have formed large green rosettes without any throw-back. One is now sending up its first fertile fronds. The rachis does not become black until the plants are quite old. I discovered *L. alpina* last Easter in the highest part of the Blue Mountains. We regarded it as a Kosciusko or Mount Wellington plant, and had not looked for it so far north. The plants settled down at once in their new beds at the low altitude, and have spread more rapidly than any other of my ferns. When exposed to an exceptionally full hot sun they wilted and browned, but have quite recovered. Others, in the shade, never went off. *L. capensis*, usually growing near or in water, found things trying, but was not killed out. I had been rather sceptical as to the validity of *Blechnum lævigatum* as a species, thinking it a form of *L. capensis*. Hooker regarded it as "a very distinct species," but Baron von Mueller admits that it can hardly be known from the Lomaria in the fruiting stage. The young plants are certainly different in appearance ; the Blechnum is always green and smooth, with short, rounded pinnæ, while the Lomaria is red and scaly, the fronds less erect, and terminating in a long, flat segment.

Asplenium nidus is the king of the fernery, seated on its central throne. With plenty of water it has developed fresh

whorls of perfect fronds and withstood the heat proudly. Beneath it flourished *A. flabellifolium*, as green and graceful as ever. It is so placed that it can droop over freely. *A. falcatum* and *A. furcatum* are generally met with on the sides or crown of rocks on the borders of stream-traversed gullies, where they have but little soil, but receive a steady drainage from the rocks. The latter is much the rarer, and a more northern species, but it has taken to the new conditions much more readily than the former. Neither have succumbed, however, nor has another rare species, *A. attenuatum*, of which I have several plants and have lost none. *A. bulbiferum*, with and without proliferations, is quite green, and has continued to put out new fronds. *A. flaccidum* was too tender; it attracted the attention of some pest, which cut off the fronds, and disappeared even before the hottest weather came. It is happy only on a tree-fern trunk in the drip of a waterfall.

Of young tree-ferns I have only three kinds—all species of Alsophila. As might be expected, *A. australis* stands hard times best of them all, and soon sends out bold fronds. *A. Leichhardtiana* is a slender fern, with very prickly rachides. During the hot term it lost about as many fronds as it produced, but is coming on now that it is freed from the torment. *A. Cooperi*, a soft, hairy species, survived the ill-treatment, but suffered more even than *A. Leichhardtiana*. In all, the young fronds now unfolding are stouter than those which preceded them, so that the roots have been gaining in strength all the time.

I have not had much success with Film Ferns, only saving a frond or two of the one I grew, *Hymenophyllum javanicum*. It is very hard to reproduce a good imitation of the natural habitat, though these plants grow well enough under glass. *Todea Fraseri* is very like the Film Ferns in this respect. The young fronds have the same delicate structure. It is a fern I tried hard to grow, as it is a charming plant, but in the open I have only left two or three starveling specimens. *Todea barbara* is not one of the easiest ferns to grow; it requires nursing—at all events in the young stages.

Young Staghorn Ferns nailed to a big old stump grew rapidly, and showed no ill effects of the heat. It is, of course, generally grown out of doors. On this stump I grew several orchids—*Cymbidium suave, Sarcochilus olivaceus, Bulbophyllum Shepherdi*, and *B. exiguum*, and *Liparis reflexa*. The first has been growing on the stump for about ten years, and flowers regularly every season. I have never seen a seedling, though the pods ripen each year and scatter the seeds over the broad top of the stump, where one would think they ought to germinate.

Pteris is perhaps the hardiest genus of them all. Native

and imported species have alike thriven with a minimum of wilting. One rarely meets with seedlings of *P. aquilina* in the bush. I came across several at Clarence, about the highest point on the Blue Mountains. The young fronds were so delicate and finely divided, and of so pale a green, that I was doubtful whether the plants were really young bracken. However, I brought one home and planted it in a favoured situation, and it soon threw out thick rhizomes, and had to be removed or it would have trampled over its more delicate neighbours. Now it is a typical bracken fern. *P. tremula*, "the Australian Bracken," as it appears to be called by British nurserymen, does not run like *P. aquilina*, but grows very speedily into a tall bush with copious fronds, and is useful in sheltering more tender ferns. I have a number of plants, and they have all put out fertile fronds. In the bush-house it propagates profusely from spores, which easily germinate in the original or in adjacent pots. Out of doors the ground is too much disturbed, as a rule, for the spores to germinate. *P. falcata* is a ground-runner, and soon spreads. It has never required any special attention, but forms effective clumps in the lower-lying beds. I have two or three plants of the variety *nana*. These have so far (for a year) maintained their dwarf habit. Some plants which I grew formerly in a box in the bush-house did gradually in the course of three or four years revert into the larger form of the type. There are several plants of *P. paradoxa*, from seedlings (I believe), with one simple frond to full-grown ferns with creeping rhizome and several pinnate leaves. The neatly cut, shapely fronds are of a deep green, and the ferns look well massed. Not one seemed to feel the heat adversely, but they were well shaded. *P. incisa* rather resented moving, but, once established, grew rapidly, with stout rhizomes and large fronds. These feel the heat. At the end of the summer plants growing in the wild state in the crannies of the rocks in railway cuttings or similar situations show a good many withered fronds. Now that the rains are falling the plants appear to be in the best of health, and are growing out vigorously. The fronds are of a particularly refreshing green, and are large enough to give shelter to other ferns. *P. umbrosa* grows along the banks of running creeks in good soil. It grows slowly at first when transplanted, but finally becomes very tall and strong. It takes several years to produce spores; in fact, I have never myself found fertile fronds in my hunting. My oldest plant, grown by me for three years, was scorched badly by the sun, so that I do not expect to see fertile fronds this year. We must be patient. *P. quadriaurita* was sensitive, and, curiously, more so than the *argyrea* variety sold by the florists. This white-striped variety

sent out some altogether green fronds, but is now growing true and very strongly. *P. cretica*, another species much sold by the florists, with several varieties, came on famously, and was far more at home in the open than in a pot in the bush-house. *P. straminea*, *P. flabellata*, and other exotic species maintained the good character of the genus.

Cheilanthes tenuifolia, which, like the bracken, is found all over Australia, is naturally an easy fern to grow. In the earlier stages, while sterile, it is very green and graceful—an elegant Parsley Fern. The fertile fronds, erect and rigid, grow usually to a height too great for the top weight, and then cling together or fall prone, so that when faded and dried the plants look very forlorn in the bush. *Notolæna distans* is always found growing amongst rocks, often in much-exposed places on dry hills, and sends its roots far down into crannies and cracks. It is accordingly difficult to shift. In nature, like the previous species, in high summer it assumes the form of withered tufts, and my cultivation could not prevent it from doing the same with me. It is alive, all the same, and is starting again with a new growth.

Aspidium, as recognized by Bentham, contains ferns very different in habit. Those which grow in rosettes, with short rhizomes, are useful plants, as they are easy to arrange. The Prickly Shield Fern, *A. aculeatum*, an old friend of mine in England, has had its ups and downs this summer. It prefers the colder climates, as of Britain and Kosciusko, but came through quite alive and not much the worse for the loss of fronds. A plant which Mr. Whitelegge identified as *A. aristatum*, from the Grafton district, quite died down, and I had given it up as lost, but now it has sent out rhizomes, and from these healthy new fronds are springing; these are of a bright glossy green. *A. acuminatum* grows in clumps, a form very near to *A. decompositum*, but not recorded by Bentham. The plants were obtained from the banks of a running creek, and have just managed to live through the time of trial, but are now promising a strong fresh growth. *A. molle* has a handsome rosette of tall fronds, and has not lost many of them. Its congener, *A. unitum*, a swamp fern growing not far from the sea, has running rhizomes, and sends up also tall fronds, which are near together, and so form clumps, and which are stiff and harsh in contrast to the soft, hairy fronds of *A. molle*. I have several plants, and all have grown on steadily during the hot weather. I have not admitted *A. exaltatum* to the fernery, but have it growing under the lee of my front garden fence. The lower half of the fence is of substantial stone, and behind this (the south) the ferns have multiplied exceedingly, and form a high and thick hedge which is sufficiently ornamental.

It spreads with great rapidity. I have only one plant of *A. capense*, which has grown well in a zone of the central eminence. In nature it grows on rocks or stumps, and as long as the roots obtain the moisture they need the fronds will stand any amount of exposure, as the hairy rhizomes are well equipped to withstand drought.

Another Hare's Foot Fern, *Davallia pyxidata*, does extremely well in the open, spreading quickly as its rhizomes creep over the rockery. *D. dubia*, common everywhere on the hillsides, stands exposure as far as the roots are concerned, but it soon looks shabby after heat and drought. It is at its best in the spring.

The Polypodiums have had varying fortunes. *P. australe* died out early. *P. pustulatum* settled down slowly. Then some insect or other pest took to cutting through the petioles of one of the plants, which was thriving, and bright green fronds lay on the ground thus cruelly amputated. The plant has recovered, but I am afraid of the same secret enemy, whom I have not yet unmasked. Another plant, among much stone (my supplied rocks), is quite vigorous. *P. scandens* is alive, but suffered badly. *P. repens* has been just holding its own in a shaded place, but has made no progress in the summer. *P. tenellum* is just alive, and no more can be said about it. All the above are forest plants growing often on rocks, and they do not readily accept the new surroundings, though I have tried to reproduce as many of the natural conditions as possible. *P. punctatum* and the giant form separated as a distinct species by Labillardière, *P. rugosulum* (*sic*), on the other hand, have simply ramped; the two keep their characters and habit, and are easily distinguished.

I had two plants of *Schizæa bifida* very well established. It grows in this district. One plant has disappeared entirely, and the other has but two undivided green fronds left. *S. rupestris* went right off when the summer came. *Gleichenia circinata* requires special care. Very young plants moved in the autumn will expand and thrive. The heat is very trying to them, but I have preserved at least one plant. On the other hand, I have had perfect success with *G. flabellata*. It has increased laterally and vertically, growing consistently throughout the summer.

I grew a few of the British ferns for the sake of "Auld Lang Syne." The Royal Fern, *Osmunda regalis*, has produced fertile fronds freely at a height of not much more than a foot. The Hart's Tongue, *Scolopendrium vulgare*, burned at first, but has quite recovered. The fronds, a tasselled variety, are of rather a paler green than I remember in the English fern. The Lady Fern, *Athyrium filex-fœmina*, has most tender and delicate

fronds, but I managed to keep it by growing in the same bed plants of *Isotoma axillaris* (from seed). These spread with a light but abundant foliage over the ferns, which they eclipsed for a while, and replaced them with a profusion of large flowers —to my surprise, quite white. I suppose the shade and unexpected good ground are responsible for this.

The mosses and liverworts, in general, survived. Each day they shrivelled up, and each evening, after watering, they were fresh and green again. Amongst them were Dawsonia and Hypnodendron and several whose names I am ignorant of. Marchantia made beautiful little carpets in the spring and early summer, showing all the organs of reproduction, in some cases gemmæ and the male and female umbrellas all appearing together on the same plant. The summer has withered off the connections and left centres of live thallia for this year's growth. Fimbriana is now forming healthy green carpets.

Summing up, it seems that almost all the terrestrial ferns can survive a severe summer if they are carefully supplied with water and are sheltered from hot winds. The rhizomes, at least, carry on in spite of the heat and dry atmosphere. The ferns which live in water spray, or clamber by thin, not woolly, rhizomes on the face of rocks which are constantly wet, are exceedingly difficult to preserve in health. I think some sort of fountain might serve to give the continual drip, but the plants would have to be kept entirely in the shade.

"IN AUSTRALIAN WILDS."—Such is the title of a new volume of natural history gleanings by Mr. Charles Barrett, C.M.Z.S., for which nature-lovers will be glad to find a place on their bookshelves. In it the author tells his experiences when searching for nature notes in out-of-the-way places throughout Australia, and, though relating principally to birds, there are enough references to other branches of natural history to hold the interest of the general reader. The chapters deal with various types of country, such as the wooded Olinda Valley, near Lilydale (Vic.), the Mallee, the dry area of Eyre's Peninsula (S.A.), the palm scrubs of the Richmond River (N.S.W.), the coral islands of the Queensland coast, &c., so that the great variety of Australian life is well contrasted. The letterpress is not burdened with scientific names, but it is well supplied with illustrations—more than 100 in all—most of them from photographs by the author, several having been taken at a considerable expenditure of time and patience—witness the successful snapping of the Coachwhip-Bird after three hours' waiting. The volume is well printed, and is a credit to all concerned in its production.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th October, 1919.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about sixty members and visitors were present.

The chairman said that members would be grieved to learn that during the previous week their hon. treasurer, Mr. F. Pitcher, had suffered another sudden bereavement by the death of his only daughter. She had been an active worker at the recent exhibition of wild-flowers, which made the shock all the more severe. He moved that the sympathy of the meeting be conveyed to Mr. and Mrs. Pitcher in their sorrow.

REPORTS.

A report of the excursion to Bendigo on Saturday, 13th September, was furnished by Mr. D. J. Paton, of Bendigo, one of the leaders, and read by Mr. C. Daley, M.A., his co-leader. The excursion, from a botanical point of view, had been a great success, but, owing to unpropitious weather, some inconvenience was experienced, and changes had to be made in the programme. About a dozen members and friends left town by the early trains, reaching Bendigo soon after mid-day. The neighbourhood of One-Tree Hill and the Spring Gully Reservoir was visited in the afternoon, and next day a visit was made to the country north-west of Eaglehawk, where the pretty little shrub, *Cryptandra amara*, was found in full bloom, accompanied by *Boronia anemonifolia*, another charming species. A few insects had been taken by the entomologist of the party, but the weather was against that branch of natural history. The chairman remarked that the original forest of the Bendigo district had practically disappeared, the whole of the trees seen being secondary growth. As the result of Mr. F. E. Wilson's description and illustration at the previous meeting, he had been able to recognize the notes of several Bell-Miners during the outing.

A report of the excursion to Alphington on Saturday, 20th September, was given by the leader, Mr. J. Searle, who reported a fair attendance of members. The afternoon was devoted to pond life, which was found to be very abundant in the pools visited. The species obtained, however, did not reveal any unusual occurrence.

A report of the excursion from Emerald to Beaconsfield was forwarded by the leader, Mr. J. W. Audas, F.L.S., who reported

a small attendance of members. During the walk of about twelve miles a large number of plants, shrubs, and trees in bloom were met with, many of them being of brilliant appearance. No less than twenty-one species of orchids were noted, among them being *Caladenia congesta, C. Menziesii, Pterostylis barbata, Thelymitra carnea,* and *Prasophyllum australe.* The Butterfly Iris, *Diplarrhena Moræa,* was abundant in places. Among other flowers seen were *Euphrasia collina, Tecoma australis, Plagianthus pulchellus, Epacris microphylla, Comesperma ericinum,* and *Bauera rubioides.*

Mr. C. Daley, F.L.S., said that four members of the Club were included in the Tourist Bureau's party which visited the Grampians during the last week of September. The flowers around Hall's Gap, the most accessible portion of the Grampians, were perhaps rather fewer than in other years, but in the more remote parts were as fine as ever. He had been pleased to notice that a large number of the tourists visited the Club's exhibition of wild-flowers on the 30th ult.

The chairman said that quite a number of Club members took advantage of the invitation given to members of the Canterbury Horticultural Society and friends to visit Mr. J. M. Watson's garden at Balwyn on Saturday, 4th inst., for the purpose of viewing the many Australian shrubs and trees which that gentleman has under cultivation, and which, in most cases, are doing extremely well.

GENERAL BUSINESS.

The chairman said that, owing to the hon. treasurer's absence in consequence of his bereavement, nothing could be said as to the financial results of the recent wild-flower exhibition. The admissions had amounted to about £130, and the sales of flowers to about £50; but he had no estimate of the expenses or the receipts from the sales of tickets. He hoped that a final announcement would be made at the next meeting.

Some suggestions for future exhibitions were made by several members. Mr. J. Gabriel had expected that seeds of native plants would have been on sale this year, as announced some time ago, and trusted this would be attempted another year. Mr. E. E. Pescott thought too much was being made of the sales of flowers, which really detracted from the object of the exhibition—viz., the display of our native flowers. Mr. E. S. Anthony thought that the committee deserved the best thanks of the members for the way in which the exhibition was organized, and moved to that effect. The motion was carried unanimously. Mr. H. B. Williamson said that the exhibition was an excellent medium for recording new localities for flowers, as well as new species, and stated that a specimen sent

by Mr. T. S. Hart, M.A., of Bairnsdale, would probably prove to be new for Victoria.

The chairman mentioned that His Excellency the Governor-General had, without announcement, paid a brief visit in the afternoon to the exhibition.

PAPER READ.

By Miss G. Nethercote, entitled "A Week at the National Park (Wilson's Promontory)."

In this the author gave an interesting account of a week spent by a party of eight girls in exploring some of the beauty spots at the National Park during January last.

The paper was illustrated by lantern views, enabling those who have not yet visited the Park to gain some idea of its characteristics; while a young koala, or native bear, *Phascolarctus cinereus*, which, by permission of the trustees, she had been allowed to bring home, indicated its presence at the meeting by an occasional grunt of satisfaction at hearing the voice of its mistress.

Several members referred to visits they had made to the Park, and Mr. J. A. Kershaw, F.E.S., the hon. secretary to the trustees, said that most of the introduced indigenous animals and birds were doing so well that all anxiety as to their welfare had ceased.

Owing to the lateness of the hour, Mr. C. Daley's paper, "At Wartook (Grampians)," was postponed to a future meeting.

EXHIBITS.

By Mr. F. G. A. Barnard.—Plant in bloom of epiphytal orchid, *Sarcochilus falcatus*, R. Br., from East Gippsland.

By Mr. F. Chapman, A.L.S.—Rock specimen from Griqualand, South Africa, showing transition from asbestos (blue) through limonite to crocodilite (brilliant yellow).

By Miss R. Chisholm.—Photographs of the F.N.C. excursion party at King Island, Bass Strait, November, 1887.

By Miss K. Currie.—Native flowers grown at Lardner—*Boronia pinnata*, *Passiflora cinnabarina*, *Kennedya rubicunda*, and *Plagianthus pulchellus*; also dried specimen of Scotch heather, *Erica vulgaris*, from Scotland.

By Mr. H. W. Davey, F.E.S.—Tadpoles retarded in metamorphosis.

By Miss A. Fuller.—Botanical specimens from near Trans-Australian railway line; Verticordia, sp., from Geraldton, W.A.

By Miss G. Nethercote.—Flowers of *Lasiopetalum Baueri*, *Bauera sessiliflora*, and *Utricularia dichotoma*, from Grampians; and flower-spike of *Banksia serrata*, from Wilson's Promontory.

By Mr. C. A. Nethercote.—Flowers of *Calythrix Sullivani* and

Prostanthera nivea, grown at Hawthorn; orchids from Silvan (Wandin South).

By Messrs. E. E. Pescott, F.L.S., and C. French, jun.—Eighteen species of terrestrial orchids from Ringwood and Frankston, including several species of Thelymitra, Diuris, Prasophyllum, &c.; also an albino specimen of *Caladenia dilatata*, and herbarium specimens of *Chiloglottis trapeziforme*, Fitz., from Paynesville, collected by Mr. T. S. Hart, M.A., new for South-Eastern Victoria; and *Thelymitra grandiflora*, Fitz., from Ringwood (new locality).

After the usual conversazione the meeting terminated.

EXCURSION TO BENDIGO.

Again taking advantage of the Railways excursion special trains, the Club's second visit to Bendigo was made on Saturday, 13th September, 1919. Unfortunately, unfavourable weather conditions were experienced, and portion of the arranged programme had to be altered; still, all seemed pleased with the outing, and no bad results were reported from the inclemency of the elements. A party of twelve, under the leadership of Mr. C. Daley, F.L.S., journeyed to Bendigo by the early trains, and were met at the station by the local party of three, which, with a visitor from Ballarat, made up a party of sixteen in all. It was now past mid-day, and after the visitors had been settled in their temporary abodes the whole party re-assembled, and proceeded by tram to the Cemetery terminus; then, crossing Back Creek, the bush was entered near Cr. Curnow's residence. The season being a late one, many of the acacias were still at their best, *Acacia pycnantha*, *A. armata*, and *A. leprosa* making the bush glorious. With them were *A. diffusa*, the Fairy Wax-flower, *Eriostemon obovalis*, *Bursaria spinosa*, and *Daviesia ulicina*. Crossing a hill and descending into a valley beyond, we found *Hovea heterophylla*, *Tetratheca ciliata*, and the orchids *Diuris maculata* (common) and *D. pedunculata*. Here we boiled the billy and had lunch, of which some of us stood much in need. As we were about to resume our walk a light shower—the first of many that afternoon—occurred. Besides the plants mentioned the following were seen in the vicinity of our lunching place:—*Pterostylis nutans*, *Anguillaria dioica*, *Hypoxis glabella*, *Geranium dissectum*, and three of the everlastings—*Helichrysum lucidum*, *H. semipapposum*, and *H. obcordatum*. The Helichrysums, however, were only in bud. As we ascended the next hill we found the vegetation greatly improved. Fine Wax-flower was here, also *Grevillea lanigera* (both white and red varieties), *Acrotriche serrulata*, *Brachyloma daphnoides* (in bud), *Melichrus*

(*Styphelia*) *urceolatus*, *Acacia acinacea*, *A. aspera*, *Pimelea glauca*, and *Dillwynia ericifolia*. The orchids *Caladenia carnea* and *C. cærulea* were here fairly common, and *Drosera Menziesii* and *D. auriculata* were found in flower, whilst, on crossing the race and entering an area which had been devastated by fire and axe some time previously, *Drosera peltata* was found, together with a single premature specimen of *Burchardia umbellata*. Leaving this unpromising locality we soon struck the road from Grassy Flat to One-Tree Hill, near the top of a hill from whence a good view of the city is obtained. On this hill grows *Veronica perfoliata*, but it was too early for flowers. *Kennedya monophylla* (locally called "Sarsaparilla") was seen here. From this point the road was followed to the top of One-Tree Hill. On the way a profusion of Wax-flower, Grevillea, Tetratheca, *Acacia aspera*, *A. pycnantha*, *Daviesia ulicina*, &c., greeted the eye at every turn. At the last turn before the top of One-Tree Hill is reached some of the party made a detour into a deep gully, where, among the rocks, we found a fine patch of *Pterostylis curta*, together with the ferns *Cheilanthes tenuifolia*, *Asplenium flabellifolium*, and *Grammitis rutifolia*. Several trees of *Acacia implexa* and some stunted *Indigofera australis* occur here, whilst the whole gully is clothed with a luxuriant growth of *Helichrysum semipapposum*, resembling from a distance tufts of ferns. Reaching the top of the hill, the party ascended "Abbott's Tower," a wooden structure recently erected by Mr. R. H. Abbott, a former mayor of Bendigo. It is about 40 feet high, and from the top an extensive view can be obtained, the chief points in view being indicated on a dial placed there. The lowering clouds, especially to the south and west, greatly limited our view; nevertheless, an excellent view of the city and its environs was seen. Leaving the tower, the party descended the hill by the road on the Spring Gully side. On the descent specimens of *Pterostylis nana*, *P. nutans*, and *P. longifolia* were seen. Near Spring Gully road *Persoonia rigida* (fruit) and *Acacia vomeriformis* occur. On reaching Spring Gully road we made across country in a south-westerly direction towards the "Boronia patch." Here we found the vegetation similar to that on One-Tree Hill, but more profuse in flower. Fine Wax-flower, Hardenbergia, Tetratheca, and Grevillea were collected. A patch of *Pterostylis barbata* was visited, but, though the plants were up, no flowers had yet appeared. Woodmen had been at work in this part of the forest, and the sucker foliage of many of the gums was unusually fine. Reaching the Diamond Hill–Mandurang road, we soon came to the turn-off, where, after crossing a hill, the Boronia came into view. This extensive yet isolated area of *B. anemonifolia* made a glorious

display of pink and white. In the vicinity a slightly different flora prevails. *Acacia Oswaldii* (just going off, and showing young pods), *Dillwynia floribunda* (a glorious mass of brown and orange), *Grevillea aquifolium*, *Marianthus procumbens*, and *Gompholobium pedunculare* (not yet flowering), are all found here. *Daviesia corymbosa* and *Correa speciosa* (var. *normalis*) were also seen. Much as we wished to linger, time pressed, and we had to hurry homewards. We took the track leading to Spring Gully Reservoir, but had not gone far when the rain, which had been long threatening, commenced in earnest, and continued to fall steadily throughout our homeward journey. Reaching the reservoir, we made straight for Spring Gully road. Tramping along in the rain and increasing dusk, our position was not very enjoyable, and long before we reached the tram we were completely soaked. As the weather continued unfavourable throughout Saturday evening, it was reluctantly decided to abandon the Whipstick excursion arranged for Sunday. It was decided to visit instead, after lunch, an interesting locality beyond Eaglehawk, where *Boronia anemonifolia* and *Cryptandra amara* grow profusely. Some of the party spent the morning viewing Bendigo and its surroundings, whilst a party of enthusiasts, under Miss M'Kenzie, set out on foot for the appointed place before lunch. The main party followed in the afternoon, taking tram to Eaglehawk, walking thence to Sailor's Gully. From here the party entered the scrub, passing the Moon group of mines. *Juncus communis* was here seen to have established itself firmly on the sand-heaps in the vicinity of old mine-workings. The profusion of *Acacia pycnantha* and *A. leprosa* (?) was the most notable feature of the bush. The Mallee Gum, *Eucalyptus viridis*, also occurred here, with *E. sideroxylon*, *E. hemiphloia*, and *E. leucoxylon*. Passing through the bush towards the Sydney Flat road, little was seen beyond *Daviesia ulicina* and *Acacia acinacea*. Near the road *Pterostylis nana* was found. *Cassinia arcuata* was common. Reaching the road near the old Australian Hotel, and crossing to the other side, we entered the area which was the object of our excursion, about two miles from Eaglehawk. We found here a complete change in the vegetation. *E. viridis* was the dominant eucalypt, with its unwelcome guest, *Cassytha melantha*. *Melaleuca decussata* was also abundant. Amongst the flowering shrubs which now met our gaze one of the most notable was *Cryptandra amara*—very effective, with its white blossoms, becoming tinted with pink as the season advances. The violet of *Prostanthera hirtula*, the gold of *Hibbertia acicularis*, *H. densiflora*, and *Acacia acinacea*, the snowy flower-heads of *Olearia teretifolia*, but, above all, the rose-pink tints of *Boronia anemonifolia*, make a

glorious assemblage of colour. The last-named was first favourite, and the main object of our visit. It is here, as near Diamond Hill, gregarious, but the patch is of greater extent, the plants are stouter, and the flowers of a deeper hue. Here we met the others, had afternoon tea, and tarried gathering bunches of Boronia. The orchids *Pterostylis mutica, Caladenia cœrulea, C. carnea, Glossodia major,* and *Diuris maculata* were found. Other plants noted were *Eriostemon obovalis, Hybanthus floribundus, Drosera Menziesii, Correa speciosa, Acacia vomeriformis, Daviesia genistifolia, Loudonia Behrii* (buds), *Hakea rugosa, Grevillea lanigera, Pimelea glauca, Craspedia Richea, Leptomeria aphylla* (fruit), *Helichrysum obcordatum, Astroloma humifusum* and *Leucopogon rufus* (fruits), *Dianella revoluta,* and *Thysanotus Patersoni.* After being photographed by Miss Hardy the party commenced the homeward march, this time keeping to the road. A smart hail-shower threatened us during our walk back, but we were fortunately able to find shelter until it had passed. From Eaglehawk we returned by tram to Bendigo, thus ending a very enjoyable outing. Most of the party returned to Melbourne by the early train on Monday morning. Mr. L. Thorn, who devoted himself to entomology, reports that, owing to the unfavourable weather, insects were scarce and difficult to capture. Among the lepidoptera collected the most noticeable were the pretty little Zygænid, *Procris viridipulverulenta,* a small bark-frequenting member of the Gelechiadæ, and three rather handsome species of the genus Philobota. The beetles captured consisted of about half a dozen species of not very great interest.

The list of plants observed during the excursion includes the following, all of which were seen in flower except those marked *o*, without flowers or buds ; *b*, in bud only ; and *ft*, in fruit only :—

RANUNCULACEÆ—
Ranunculus lappaceus.

DILLENIACEÆ—
Hibbertia acicularis.
densiflora.

LAUREACEÆ—
ft Cassytha glabella.
melantha.

VIOLACEÆ—
Hybanthus floribundus.

PITTOSPOREÆ—
Bursaria spinosa.
Marianthus procumbens.

DROSERACEÆ—
Drosera Whittakeri.
auriculata.
peltata.
Menziesii.

TREMANDREÆ—
Tetratheca ciliata.

RUTACEÆ—
Boronia anemonifolia.
Eriostemon obovalis.
ft Correa speciosa, var. normalis.

GERANIACEÆ—
o Geranium dissectum.
o Pelargonium Rodneyanum.

LEGUMINOSÆ—
o Gompholobium pedunculare.
Daviesia ulicina.
b corymbosa.
b genistifolia.
Dillwynia ericifolia.
floribunda.
Hovea heterophylla.
Indigofera australis.
Kennedya monophylla
Acacia diffusa.
aspera.
armata.
vomeriformis.
acinacea.
pycnantha.
leprosa (?)
Oswaldii.
o implexa.
o mollissima.

HALORAGEÆ—
b Loudonia Behrii.

MYRTACEÆ—
o Calythrix tetragona.
o Melaleuca decussata.
ft Eucalyptus macrorrhyncha.
leucoxylon.
sideroxylon.
o melliodora.
o hemiphloia.
ft elæophora.
o rostrata.
viridis.

RHAMNACEÆ—
Cryptandra amara.

UMBELLIFERÆ—
o Hydrocotyle laxiflora.

SANTALACEÆ—
ft Leptomeria aphylla.
ft Exocarpus cupressiformis.

PROTEACEÆ—
ft Persoonia rigida.
Grevillea lanigera.
aquifolium.
Hakea rigida.

THYMELEACEÆ—
Pimelea glauca.

COMPOSITÆ—
Olearia teretifolia.
b Helichrysum semipapposum.
b Helichrysum lucidum (bracteatum).
b Helichrysum obcordatum.
o Cassinia arcuata.
Craspedia Richea.
Millotia tenuifolia.
Erechtites quadridentata.
Microseris Forsteri.

SCROPHULARINEÆ—
o Veronica perfoliata.

LABIATÆ—
Prostanthera hirtula.

EPACRIDÆ—
Astroloma humifusum.
Melichrus urceolatus.
ft Leucopogon rufus.
Acrotriche serrulata.
o Brachyloma daphnoides.

ORCHIDEÆ—
Diuris maculata.
pedunculata.
Pterostylis curta.
nutans.
nana.
b barbata.
mutica.
longifolia.
Caladenia carnea.
cœrulea.
Glossodia major.

AMARYLLIDEÆ—
Hypoxis glabella.

LILIACEÆ—
b Dianella revoluta.
Anguillaria dioica.
Burchardia umbellata.
Thysanotus Patersoni.

JUNCACEÆ—
Juncus communis (?).

FILICES—
Cheilanthes tenuifolia.
Asplenium flabellifolium.
Grammitis rutæfolia.

D. J. PATON.

EXHIBITION OF WILD-FLOWERS.

Once again the Melbourne Town Hall was selected for the exhibition of wild-flowers, which has become an annual fixture of the Field Naturalists' Club of Victoria. The date chosen was Tuesday, 30th September, and again there was a large attendance of the general public, indicating thereby that the efforts of the Club and its friends are appreciated. Following the custom of recent years, the proceeds were announced to be divided between the Anzac House Fund appeal and a fund for publishing a list of common names for Victorian plants. It is too soon yet to say to what extent these funds will benefit, but it is expected that the profit will amount to about £150.

The exhibition, which was under the patronage of Her Excellency Lady Helen Ferguson, G.B.E., was opened in the afternoon, by the State Commandant, Brigadier-General Brand, C.B., V.D., who compared Australian wild-flowers to Australian "diggers" (soldiers), saying that they get on best without too much attention and too much coddling—all they want is a square deal. He thanked the Club for selecting the Anzac House as the object of its help, and said that, while Australian wild-flowers were reputed to be the hardiest in the world, the same could be said of the Australian soldiers and the Australian horses. All through the trying Palestine campaign the latter had proved themselves hardier than those from elsewhere, while the "diggers" had endured the withering heat of Egypt and the mud and cold of Flanders with less wastage from sickness than any other corps. The Anzac House would be a great boon to returned men, and he could assure them that it would be run on strictly temperance principles.

The president, Mr. A. D. Hardy, F.L.S., in thanking General Brand for honouring the exhibition with his presence, said that the Field Naturalists' Club, as part of its endeavour to popularize the native flowers, proposed, if the result of the exhibition allowed it, to publish something in the way of a list of adopted popular names for Victorian plants, which he felt sure would be welcomed by enthusiasts.

Among the visitors during the afternoon was His Excellency the Governor-General, who, unanticipated, spent a short time in viewing the exhibits, with which he expressed himself very pleased.

The display of flowers was finer than had been expected, for, the winter and early spring having been very dry, the committee had become somewhat anxious; however, everybody was satisfied that the exhibition was quite equal to previous efforts. All the Australian States were represented by col-

lections, mainly from the Botanical Gardens of the capital cities. The flowers from the Melbourne Botanic Gardens were given the pride of place near the platform, and the director, Mr. J. Cronin, F.R.H.S., was greatly complimented on the brilliance and variety of the species shown. He also contributed palm leaves and other greenery for decorative purposes.

The principal inter-State exhibitors were :—New South Wales.—Mr. J. H. Maiden, I.S.O., Botanic Gardens, Sydney ; Mr. E. Cheel, Botanic Gardens, Sydney ; and Mr. W. Bass, Chard-road, Brookvale, *via* Manly. Queensland. — The Director, Botanic Gardens, Brisbane. South Australia.—The Director, Botanic Gardens, Adelaide. Tasmania.—Mr. J. Wardman, Botanic Gardens, Hobart. Western Australia.— Mr. Fisher, St. George's-terrace, Perth ; Mrs. Bourke, Perth ; and Mr. J. D. Gloster, Kelmscott.

Among the Victorian exhibits the principal was that from the Grampians, for which Miss G. Nethercote, Mrs. Kimberley (Wartook), Miss Craig (Fyans Creek S.S.), Messrs. C. Daley, C. D'Alton, F. D'Alton, C. J. Gabriel, H. Hughes, — Nalder (Pomonal), and other friends were responsible. The exhibit included fine specimens of the Native Heath, *Epacris impressa*, Thryptomene, *Sprengelia incarnata, Pultenæa rosea, Bauera sessiliflora, Lhotzkya genetylloides, Grevillea alpina, Conospermum Mitchelli, Boronia pinnata, B. pilosa, Glossodia major*, &c.

The other exhibits represented a wide range of localities throughout Victoria. The following are the names of the exhibitors as indicated on the parcels :—North-West.—Kiata, Misses A. and A. Brooks ; Mokepilly, *via* Stawell, Mrs. A. Cragg ; Wedderburn, E. D. Gray ; Stawell, Rev. — Henderson ; Stawell, J. Hill ; Kiata, R. Oldfield ; Kaniva, N. Sherwin ; Tresco, Miss M. Mewton. South-West.—Casterton, H. C. James. North.—Maldon, F. B. Brooks ; Bendigo, Girton College, D. J. Paton, J. Semens, R. J. Warren ; Mandurang, — Halliday ; Longlea, J. Taylor ; Heathcote, F. Rankine ; Rushworth, F. Rich. South.—Rhyll, Phillip Island, Miss J. Abery, Miss R. M'Phee ; Belgrave, F. G. A. Barnard, F. Pitcher ; Bunyip, Mrs. A'Beckett ; Longwarry, Mrs. E. Wallace ; Beaconsfield, Mrs. Drake, Rev. J. Wilson ; Pakenham, F. Wisewould ; Narre Warren East, Mrs. Haysey ; Ferntree Gully, A. N. Burns ; Millgrove, B. Glass, W. B. Overall ; Yarra Junction, J. Grainger ; Evelyn, W. H. English ; Toolangi, Mrs. Smedley ; Panton Hill, Miss Hollinger ; Greensborough, — Ford ; Blackburn, Miss Coleman ; Brighton, Miss Fisher ; Sandringham, Miss G. Nokes, Miss F. Hand ; Mentone, Master Tovey ; Emerald and Beaconsfield, J. W. Audas ; Moorabbin, A. Hand. North-East.—Lima East, Mrs. M. Evans. East.—Heyfield, Mrs. E. Best ; Paynes-

ville, Mrs. F. W. Burton ; Briagolong, J. Firth ; Nowa Nowa, — M'Lachlan ; Traralgon, G. Mason ; Bairnsdale, T. S. Hart. Flowers were also received from Miss Chisholm, Windsor ; Mr. F. Chapman, Balwyn ; Mr. J. E. Dixon, Richmond ; Mr. J. Fraser, Camberwell ; and Mr. H. B. Williamson, Clayton.

Garden-grown Australian flowers were contributed by Mr. J. M. Watson, "Maranoa," Balwyn ; Mr. F. Chapman, Balwyn ; Mr. Geo. Coghill and Mr. E. Teele, Canterbury.

With flowers from so many widespread localities there were doubtless many species which should be recorded, but the time available for the purpose is so limited that little in that direction can be done. Among Victorian rarities, or flowers not usually exhibited, were *Thryptomene Miqueliana, Clematis glycinoides, Eriostemon trachyphyllus,* and *Pomaderris betulina,* from Mr. T. S. Hart, M.A., Bairnsdale ; *Pleurandropsis phebalioides, Trymalium D'Altoni, Epacris lanuginosa,* and *Epacris impressa* (double red), from the Grampians ; *Phebalium obcordatum* and *Cryptandra amara,* from Mr. D. J. Paton, Bendigo ; *Cassia australis,* from Gippsland ; and *Pomaderris lanigera,* locality ?.

The display of orchids made by Messrs. E. E. Pescott, F.L.S., and C. French, jun., was of great interest to many people. It included about forty-three species and varieties, among them being fine spikes of the large terrestrial orchids *Phaius grandifolius* and *P. Bernaysii,* from Queensland. Several baskets of orchids beautifully arranged by Mrs. Coleman, of Blackburn, were a feature of the display. Among the more uncommon species exhibited were *Thelymitra epipactoides, Prasophyllum album, Pterostylis barbata, Acianthus exsertus,* and *Chiloglottis trapeziforme.* Two fine plants of *Sarcochilus falcatus,* and one of *Dendrobium striolatum,* in bloom, attracted much attention.

The usual difficulty—want of time—was experienced in arranging a table showing the systematic classification of representative species, and again as regards naming. Though Dr. Sutton, Mr. H. B. Williamson, and others managed to get through a large number of exhibits, many remained unlabelled for want of time.

The Ormond Plant Farm (Mr. J. Robinson) had an exhibit of Australian flowering plants (in pots for sale), including *Boronia elatior, Leschenaultia biloba,* &c., which found ready sale.

A ladies' committee undertook the sales of flowers, and by that means over £50 was raised, Waratahs from New South Wales and Kangaroo Paws from Western Australia finding ready buyers at good prices. Mr. D. J. Paton forwarded quantities of Boronia from Bendigo, which also proved a good seller, while the Grampian flowers were in great demand.

The refreshments were in charge of a party of Red Cross ladies, and a ladies' string orchestra provided agreeable music at intervals.

Miss Amy Fuller's water-colour drawings of South African, Western Australian, New South Wales, and Victorian flowers were greatly admired by a large number of visitors.

The Club was indebted to the *Age* proprietary for paper for covering the tables, and to the Canterbury Horticultural Society for the use of specimen glasses, &c.

The thanks of the Club are due to those members, headed by Messrs. F. Pitcher and J. Gabriel, who gave up so much of their time in carrying out the details of the exhibition.

The Fish-Remains of New Zealand.—The Geological Survey branch of the New Zealand Department of Mines has recently issued an interesting bulletin (No. 7) entitled "The Cretaceous and Tertiary Fish-Remains of New Zealand." The report is the work of Mr. Frederick Chapman, A.L.S., palæontologist, National Museum, Melbourne. It is based on the examination of some 550 specimens of fossils forwarded to Melbourne by the N.Z. Geological Survey and the Canterbury Museum. Some thirty years ago a number of similar fossils were examined by Mr. J. W. Davis, F.G.S., and the results published in the *Transactions of the Royal Dublin Society*. Mr. Chapman has revised the previous work on the subject, and has had to make a large number of alterations in naming, reasons for which are fully set out in the bulletin. The specimens were principally sharks' teeth, and many of them occur in Victoria, as well as in other parts of the world.

The Melbourne Zoo.—The story of how we got our "Zoo" is told by Mr. A. W. Greig in the *Argus* of Saturday, 4th October. It is interesting to learn that so long ago as October, 1857, a meeting was held in Melbourne for the purpose of forming an Ornithological Society; but it was not, as its title might imply, to study ornithology—it was intended more for improving the breeds of poultry. However, out of that proposal developed our Zoo, one of the leading institutions of its kind in any land, and a monument to the energy of the Le Souëf family, two of whom have transferred their activities to other States, to the latter's great advantage. Mr. Greig, who is the hon. secretary of the Historical Society of Victoria, is an authority on the histories of the many local societies, institutions, &c., which, taken together, serve to make life pleasanter in these days of feverish haste.

The Victorian Naturalist.

Vol. XXXVI.—No. 8. DECEMBER 4, 1919. No. 432.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th November, 1919.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about fifty members and visitors were present.

REPORTS.

A report of the excursion to Eltham and St. Helena on Saturday, 18th October, was given by the leader, Mr. E. S. Anthony, who reported a large attendance of members. The afternoon was spent in viewing *in situ* a number of nests of various birds, to which the party was kindly guided by Mr. W. Tonge, a resident of the district. Among these was that of the Tawny Frogmouth, and it was hard for visitors to believe that they were looking at a bird on its nest rather than a projecting broken branch, so well was the deception carried out.

On the motion of Messrs. Barnard and Robertson, a hearty vote of thanks was passed to Mr. and Mrs. Tonge for their kindness on the occasion.

A report of the excursion to Evelyn on Saturday, 25th October, was given by the leader, Mr. W. T. C. Kelly, who said that a fair party took part in the visit to his country home near Evelyn, of the natural surroundings of which he at present knew but little. He hoped, however, at a later date to be in a position to make such a visit more interesting and instructive than the recent one.

Mr. F. Keep said that Mr. Kelly's home garden was an interesting study in itself, and that the party was very much indebted to Mr. and Miss Kelly for their hospitality on the occasion.

A report of the excursion to Mont Albert and Balwyn on Saturday, 1st November, was, in the absence of the leaders, Messrs. Chapman and Searle, given by Mr. F. G. A. Barnard, who said that, probably owing to an unpleasant day, the attendance of members was smaller than the interest of the district warranted.

A report of the excursion to Emerald on Tuesday, 4th November (Cup Day), was given by the leader, Mr. E. E. Pescott, F.L.S., who said that about twenty members and friends took part in the outing, which had been arranged for the purpose of visiting the famous tree nursery of Messrs. C. A. Nobelius and Sons. Here were found many beautiful exotic trees and shrubs, together with much native vegetation in the fern gullies on the estate. An opportunity to see the process of manufacture of New Zealand flax fibre from plants grown on the adjacent hillsides was availed of, and great

interest displayed in the method of preparation. On leaving the nursery, Mr. W. Scott, a member of the Club, now residing at Emerald, invited the party to afternoon tea at his homestead, after which he led the way to the tourist track along Menzies Creek, which was followed up-stream to Paradise station, from whence the return journey to town was commenced.

Mr. Pescott moved that a letter of thanks be forwarded to Mr. Nobelius for his kindness in allowing the party to ramble over the nursery and to inspect the operations of the flax mill. This was seconded by Mr. Barnard and carried unanimously.

In reply to the chairman, Mr. Pescott said that he saw only one Cyathea in the fern gully. It is a very fine specimen, with fronds at least fifteen feet long and about four feet wide. Mr. Hardy said that a number of these rare ferns had been planted in the gully some years ago, but they had been carried off by plant thieves.

GENERAL BUSINESS.

The chairman stated that an announcement had recently been made of the death, near Sydney, of Mrs. Lucas, wife of Mr. A. H. S. Lucas, M.A., an hon. member of the Club, and who had lately shown his continued interest in the Club by contributing papers to its proceedings. He moved that a letter conveying the sympathy of the members be forwarded to Mr. Lucas. This was carried in silence.

The hon. treasurer, Mr. F. Pitcher, reported that all the tickets issued in connection with the recent exhibition of wild-flowers were not yet accounted for. The credit balance at present stood at £165 10s. 5d. He hoped to add a few pounds to that amount when all the returns are to hand.

Mr. E. E. Pescott, F.L.S., made further suggestions as to future exhibitions. He said that systematic classification should not be sacrificed to anything whatsoever; that trade exhibits should be encouraged, as the nurserymen can do much to inculcate a love for Australian flowers, and, if encouraged, it will be to their advantage to do so; that pot plants and seeds should be on sale; and that the doors should be open continuously from 12 noon till closing time, so that persons engaged in business could have an opportunity of viewing the exhibition during luncheon or tea hours.

Mr. Coghill thought it might be advisable to hold the exhibition later in the week, so as to give more time for the receipt of inter-State parcels. He also urged the securing of the hall as far ahead as possible, so as to prevent disappointment. As it was possible there would be no Railways excursion to the Grampians next year, some way of obtaining flowers from there would have to be thought out.

Mr. J. A. Kershaw, F.E.S., referred to the approaching

retirement of Professor Sir Baldwin Spencer, K.C.M.G., from the Chair of Biology at the University, which he had held for a period of thirty-three years. A committee of his co-workers, friends, and students, past and present, had been formed with the view of perpetuating the memory of his work in some way. Professor Spencer, he said, had always been a good friend of the Club, had been its president in 1891–3, and again in 1895–7. He had also filled the offices of vice-president and committeeman. To him was largely due the success of the effort to secure Wilson's Promontory as a National Park. He urged members to favourably consider the matter of subscribing to the fund.

The chairman spoke in eulogistic terms of Professor Spencer's many spheres of work. Mr. F. Pitcher thought that it would not be out of place for the Club to become a subscriber to the fund, and moved that one guinea be donated. Mr. D. Best considered that the idea of the Club's appreciation of Professor Spencer's work could not be adequately expressed by such a sum, and moved as an amendment that five guineas be donated. This was seconded by Mr. G. Coghill. Mr. E. E. Pescott, in seconding Mr. Pitcher's motion, remarked that the goodwill of the Club was not to be expressed in measure of money, and that the state of the finances had to be borne in mind. On being put to the meeting the motion was carried. Mr. Kershaw undertook to receive any subscriptions members might be willing to give towards the fund.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Harvey Cheeseman, 244 North-road, Brighton; Mr. Colin Allen, 374 Auburn-road, Hawthorn; and Mr. John Harper, Metropolitan Gas Co., Flinders-street, Melbourne, were duly elected ordinary members; and Mr. Henry E. James, Henty-street, Casterton, as a country member of the Club.

PAPER READ.

By Mr. C. Daley, B.A., F.L.S., entitled "At Wartook (Grampians)."

During a recent visit to Hall's Gap, at the Grampians, the author, accompanied by three other members of the Club and some visitors at "Bellfield," varied the usual excursions made by engaging on the longer trip to the Wartook Reservoir, distant about twelve miles. The route lay along the Mount Difficult Range, above the course of the Stony Creek, and was at times very steep and rugged. On reaching the crest of the range the Mackenzie watershed was entered, which, being on the western slope, was much easier to travel. All the way flowers of numerous species were abundant, and large collections were made for the purposes of the recent exhibition of the Club. The Wartook Reservoir was found to be most picturesquely situated, and some three miles below the reservoir are the

Mackenzie Falls, where the stream makes a drop of about 90 feet amid very wild surroundings. The night was spent at Wartook, and the return journey made the next day. The author voiced the fear that the popularity of the Grampians is gradually leading to the depletion of favourite plants in localities where they were once plentiful, and future visitors will have to go further afield to see the floral beauties of the district.

The paper was illustrated by photographs of the district and dried specimens of some of the more uncommon flowers.

NATURAL HISTORY NOTES.

Mr. F. Cudmore called attention to photographs of localities in South Australia which he had recently visited. The cliffs on the Lower Murray River and the hard limestone of the Nullabor Plain at Ooldea (East–West railway) are of Janjukian age, while the glacial conglomerate and glaciated pavement rock (Grey Spur and "Selwyn's Rock") of the Inman Valley are of Cambrian age. Two fossil sharks' teeth, *Hemipristis serra*, Agassiz, and Pristis, sp., were found on the Murray—the former being a new record for Australia, and the latter one for the Australian Janjukian beds.

Mr. T. S. Hart, M.A., forwarded a note in explanation of his exhibit of natural seedlings of the Large Dodder-Laurel, *Cassytha melantha*. These were found growing in light sandy soil with a litter of dried leaves, &c., from a tree of *Eucalyptus amygdalina*, near var. *nitida* (Howitt's *E. amygdalina*, C.), on which the parent Cassytha was parasitic, at Moormurng, seven miles south-west of Bairnsdale, on 10th October. The seedlings root at first in the soil, but quickly become parasitic, after which the root-connection dies off, there never being much root development. Similar stages in cultivation were recently figured by Prof. Ewart in the *Proceedings of the Royal Society* (vol. xxxi., part 2), and it was his notes which suggested the search and indicated the season. The seedlings also agree with information kindly supplied by Mr. C. C. Brittlebank.

EXHIBITS.

By Mr. E. S. Anthony.—Photographs of Robin's nest, with young birds, taken at Eltham, 7th October, 1917; photographs of nest and eggs of Chough, also Tawny Frogmouth, taken at Eltham.

By Mr. F. Cudmore.—Photographs taken during September and October of geological features at Ooldea, on the East–West railway, Victor Harbour, Murray River, and Inman Valley, South Australia.

By Miss C. C. Currie.—Fungus, *Polyporus mylittæ*, known as Native Bread, from Lardner, Gippsland; piece of petrified wood

from same neighbourhood ; also pupa of wood-boring beetle, Phoracantha, sp., rare in the pupal form, but common in firewood in the larval state.

By Mr. C. Daley, B.A., F.L.S.—Dried specimens of *Calectasia cyanea,* Blue Tinsel Lily ; *Sprengelia incarnata,* white variety of Pink Swamp-Heath ; *Epacris lanuginosa,* Woolly Epacris ; *Hovea longifolia,* Long-leaved Hovea, &c., from Wartook, Grampians ; photographs of Wartook Reservoir and Mackenzie Falls, in illustration of paper.

By Mr. A. D. Hardy, F.L.S.—Enlarged photographs of Mackenzie River Falls, near Wartook, in illustration of Mr. C. Daley's paper.

By Mr. T. S. Hart, M.A.—Natural seedlings of Large Dodder-Laurel—(*a*) seed just sprouting, and plant not long free from seed ; (*b*) coiling on a dry stick ; (*c*) rooted in ground and attached to Hibbertia.

By Mr. F. Keep.—Flowering branch of *Leptospermum scoparium,* a New Zealand variety, with white petals and pink centre, grown at Canterbury (bush about twelve feet high).

By Mr. P. C. Morrison.—A pseudo-scorpion, Chelifer, sp., found on a blotting pad at Prahran.

By Miss G. Nethercote.—Flowering specimens of *Leptospermum scoparium,* var. *Nicholli,* also ordinary form, grown at Hawthorn ; fern fronds collected at Emerald, 4th November ; also *Brunonia australis,* Blue Pincushion, and orchids, collected at Kilmore Junction.

By Mr. C. Oke.—Coleoptera, also land shells, *Paraphanta atramentaria* (black) and *Helicarrion Cuvieri* (brown), collected on Emerald excursion.

By Mr. E. E. Pescott, F.L.S.—Flowers of orchids, *Diuris punctata, Caleya major, Prasophyllum album, Microtis porrifolia, M. atrata, Chiloglottis Muelleri, Pterostylis nutans,* and *Caladenia dilatata,* from various localities ; flowering specimens of *Leptospermum myrsinoides* (pink and white forms), *L. scoparium, Drosera pygmæa, Utricularia dichotoma, Melaleuca squarrosa,* and *Casuarina paludosa* ; also the introduced grass, *Bromus Madritensis* ; samples of green and dry flax fibre from *Phormium tenax,* in illustration of remarks on visit to Emerald Nursery.

By Mr. H. B. Williamson.—Specimen of Early Nancy, *Anguillaria dioica,* R. Br., from Mitta Mitta, exceptionally tall (15 inches) and robust, collected by Mr. H. Clinton.

After the usual conversazione the meeting terminated.

Omission.—The following exhibit should have been recorded in last *Naturalist* for October meeting :—

By Mr. H. B. Williamson.—Specimens of *Thryptomene Miqueliana,* F. v. M., collected at Paynevsille by Mr. T. S. Hart, M.A., new for Victoria (recorded for New South Wales and South Australia).

EXCURSION TO ELTHAM AND ST. HELENA.

The day appointed for this excursion (Saturday, 18th October, 1919) proved to be ideal as regards weather conditions, and it was not surprising, therefore, to find, on assembling at Eltham, that our party numbered thirty-four members and friends. We were met by Mr. W. Tonge, a local resident and enthusiastic ornithologist, who kindly gave up the afternoon in order to point out the nesting-places of a number of birds which he had located. After crossing the Diamond Creek, Mr. Tonge guided the excursionists along its banks, the descent being made on the steep western side. The picturesque nooks and bends of this tortuous stream were much admired. Silver wattles grew abundantly, and several varieties of eucalypts were noticed, whilst buttercups and maiden-hair ferns were observed growing in profusion. Several specimens of the spider orchid were obtained. The afternoon of a decidedly warm summer day is perhaps the least favourable time to see much bird-life, but signs and sounds of numerous species were nevertheless noted. The ubiquitous Kookaburra, the dainty Blue Wren, the Rufous-breasted Whistler, and the Harmonious Shrike-Thrush were mostly in evidence. Under Mr. Tonge's guidance several nests in occupation were pointed out, the first being that of the Derwent Jackass or Butcher-bird, *Cracticus destructor*. This was situated in a stringybark-tree about twenty-five or more feet above the ground, and is a nest made of small twigs and lined evenly with grasses. Perhaps the most interesting event of the afternoon's excursion was the next nest, located in the horizontal fork of a stringybark-tree, some twenty-five feet from the ground. This was a flimsy apology for a nest—just a few twigs and leaves thrown together—and on this the hen bird of the Tawny Frogmouth, *Podargus strigoides*, was sitting, apparently asleep. It was difficult for the uninitiated at first to believe it was the upper part of a bird which we were looking at, there being at least no sign of a beak. The resemblance to a short, bark-covered, broken branch was very marked, and it was not until the bird was disturbed by throwing sticks towards it that this evidence of animal mimicry was clearly illustrated. The bird, evidently resenting the intrusion, changed from its stretched-out sleeping posture to an attitude of alertness and attention, slowly turning its head from side to side looking for the cause of the disturbance. Much regret was expressed that no one had brought a camera, as it was felt a unique opportunity was lost. Considerable interest was shown in several nests of the White-winged Chough, *Corcorax melanorhamphus*, of which excellent views were obtained. Made of mud strengthened with shredded stringybark and lined with the same material, and set high up on lateral branches of stringybark-trees, these bowl-

like nests, so symmetrically formed, were much admired. Sometimes the same nest is used for several years. A deserted home of the Harmonious Shrike-Thrush, *Colluricincla harmonica*, was next visited, and, as it was perched only about six feet high, an interior as well as exterior inspection was made. The creek bank and flats were then left for higher ground, and a Magpie's (White-backed, *Gymnorhina leuconota*) nest was pointed out. This was specially interesting from the fact that a pair of Yellow-tailed Tomtits, *Acanthiza chrysorrhoa*, had built in the under portion a home for themselves. Thus, two grades of bird society were represented in quite modern fashion—the Tomtits in the lower and the Magpies in the upper flat of this domicile. An adjournment was then made for afternoon tea, which had been thoughtfully provided by Mrs. Tonge at her home close by, and while partaking of "the cup that cheers" the visitors were able also to enjoy the extensive view across the Yarra valley to the Dandenong Ranges. Thanks were expressed to Mr. and Mrs. Tonge for their hospitality by the leader and Mr. F. G. A. Barnard, and were suitably acknowledged by Mr. Tonge. The party at this stage divided forces, some wishing to catch the early train back to Melbourne, the majority, however, deciding to complete the afternoon's programme by journeying to St. Helena. A walk of about a mile through some interesting scrub country brought the excursionists to the desired haven, which was found to be a quaint little church hidden in the bush, built in the old English style, and surrounded by a churchyard planted with cypress and other trees. The visitors were delighted with the beauty of this secluded place of worship, with its mural tablets and stained glass windows and its touch of the old world. Though not quite in the study of natural history, the ancient tombstones, bearing dates of 1790 and onwards, were carefully scanned, one remarkable epitaph recording the resting-place of the last of a family descended in one unbroken line from father to son for 779 years. A pleasant walk of about two miles to Greensborough, where the home train was caught, completed the outing. About eight or nine of the party elected to miss St. Helena, and remained with Mr. Tonge, who delighted them by showing his fine collection of eggs, containing many rarities, and a number of nests displayed in their original positions in the tree branches, also in his collection. Notable among these were those of the Olive-backed Oriole, *Oriolus viridis*, the Orange-winged Tree-runner, *Sittella chrysoptera*, the Yellow-breasted Shrike-Robin, *Eopsaltria australis*, and the White-shafted Fantail, *Rhipidura albiscapa*. In his own grounds the nest of the Striated Tit, *Acanthiza lineata*, in a red box sapling, was also viewed, and in a clump of mistletoe a nest of the Yellow-tailed Tit, *A. chrysorrhoa*, both in occupation this season. The

nests of the Striated Tits of this district are usually built of shredded stringybark and cobwebs and lined internally with feathers. The lesson of the excursion was that even so close to the city—sixteen miles—there is still scope for the study of ornithology, and if residents in localities accessible for a day's or half-day's visit could be induced to provide a similar outing, very much more impetus would be given to this interesting branch of natural history by city dwellers and lovers of our native fauna.—E. S. ANTHONY.

EXCURSION TO MONT ALBERT AND BALWYN.

A PARTY of about eighteen, including several members of the Microscopical Society, met at Mont Albert station on Saturday afternoon, 1st November, for a ramble round the district. After examining the Tertiary outliers of Kalimnan sands on the Reservoir Hill (420 feet), and securing samples of the sand for washing out heavy minerals, we descended Elgar-road towards the Surrey Dive, noting the conduit for surface and subterranean water from the heights, which keeps the ponds and brick-pit water-hole continuously supplied. Pond-hunters were soon busy. The first dip of the net showed that that variable species of Cladocera, *Daphnia carinata*, was present in great numbers, and, as is commonly the case when ponds are contaminated with sewage, nearly every specimen was densely covered with a parasitic growth—probably an algæ—carapace, antennæ, and limbs all being covered with the parasite. The other Cladocera noted were Bosmina and Alona. The Copepods, *Bœckella oblonga* and *Cyclops albidus*, also occurred. The only Ostracod noted was *Cypridopsis minna*. Some beautiful Stentors were seen, also numerous Diatoms. The deep, clear water in the Surrey Dive was a pleasant contrast to the pond we had just left, and we found its water swarming with that elegant little Copepod, *Brunella ampulla*, first described by one of the leaders from the Yan Yean Reservoir. Less numerous was a Rotifer, Pedalion, sp., while near the banks of the Dive *Cypridopsis minna* was in evidence. Leaving the Surrey Dive and crossing the Box Hill railway line, we descended to the White Horse-road and began our walk towards the Mont Albert tram terminus, noting on the way the great basin of the Koonung Creek and the higher and shallower valleys of the W. Creek, divided by the watershed at Union-road. Steps were then turned westward to Mr. Maling's ground, where, at the sides of a large pond in an old quarry, the aquatic-life students were again busy. Here we found *Ottelia ovalifolia* and an introduced Nymphæa growing in patches at intervals around the pool. Owing to the steepness of the banks at the place where the latter grew, its large, round leaves were out

of reach, much to our disappointment, as the under side of these are likely resting-places for many sedentary forms of micro-organisms. The patches of Ottelia were found to be literally covered with a large pond snail, Limnæa, sp. The quaint little Entomostracean, Bosmina, was present in immense swarms, and the Rotifers Synchota and Euclanus were also noted. During the examination of the collected material it was noted that the cercaria of the liver-fluke was being given off freely from many of the snails, while the dissection of some of the snails in search of the rediæ of the fluke showed that every snail opened contained specimens of the curious worm Chætogaster. The rocks here were seen to be folded into an anticline, and the quartz and mudstone intimately associated. Some of this hardened rock contains small cubical cavities, indicating the former presence of pyrites crystals, which had been subsequently dissolved out.—F. Chapman, J. Searle.

NOTES ON THE COLEOPTERA OF NORTH-WESTERN VICTORIA.

Part VII.*

By J. C. Goudie.

(*Read before the Field Naturalists' Club of Victoria, 8th Sept.*, 1919.)

A considerable time has elapsed since the last paper on this subject appeared in the *Naturalist*. The delay, however, has been more advantageous than otherwise, since a fair number of additional species has been obtained during the interval. Moreover, several valuable memoirs on Australian Coleoptera have been published by various authors, and this has enabled me to identify with certainty many species that would otherwise have been excluded from the list.

CUCUJIDÆ.

The Cucujidæ are represented in this district by very few species, all of small size and comparatively rare. They are greatly depressed or flattened and more or less parallel in form, with four-jointed tarsi and short antennæ, and are found generally under the bark of trees or in ants' nests.

Mr. Lea states that the genus Nepharis "has been transferred from the Colydiidæ to the Silvanides of the Cucujidæ by Mr. Grouvelle (*Ann. Soc. Ent. Fr.*, 1912, p. 320), who also proposed a new genus (Nepharinus) for *N. goudiei*."

1841.†*Ipsaphes mærosus*, Pasc.

* Previous parts of this paper appeared in the *Victorian Naturalist*, vol. xxvi., p. 39; xxvii., p. 153; xxviii., p. 117; xxix., p. 72; xxx., p. 189; and xxxi., p. 138.

† The numbers refer to Masters's Catalogue and Supplement.

7976. *Læmophlæus pusillus*, Schon.
An introduced species.
Cryptamorpha villosa, Grouvelle.
On the ground, under dead leaves.
1873. *Silvanus castaneus*, Macl. (?)
1826. *Nepharis alata*, Cast.
1827. *N. costata*, King.
Nepharinus goudiei, Lea, Proc. Roy. Soc. Vic., xvii. (new series), part 2, p. 377, plate xxvii., figs. 3–9.

The small beetles belonging to the genus Nepharis are very remarkable in appearance and habits. The head is produced, rostrum-like, in front, with very short antennæ. *N. alata* has the sides of prothorax produced into flattened, wing-like lobes. In *N. costata* and Nepharinus the sides of prothorax are strongly serrated. The antennæ of the latter, really many-jointed, appear as if composed of a single joint, while its eyes are so small as to be almost invisible. A new species (*Nepharis serraticollis*, Lea) was discovered at Geelong by Mr. H. W. Davey, while another (*N. doddi*, Lea) comes from Cairns, Queensland. All the species occur as guests in the nests of ants, *Iridomyrmex nitidus* apparently being the one most favoured, although Nepharinus has so far only been found with *Crematogaster læviceps*.

CRYPTOPHAGIDÆ.

7996. *Atomaria australis*, Blackb.

LATHRIDIDÆ.

8005. *Lathridius costatipennis*, Blackb.

DERMESTIDÆ.

1887. *Dermestes cadaverinus*, Fab.
1891. *D. vulpinus*, Fab.
8053. *Anthrenus varius*, Fab.

Introduced pests, which are only too well known for their ravages amongst skins and hides, also museum specimens.

BYRRHIDÆ.

1911. *Microchætes scoparius*, Er.

This curious tufted, pellet-like little beetle has been found by several collectors to associate with ants.

HETEROCERIDÆ.

8061. *Heterocerus indistinctus*, Blackb.

A small, mottled greyish insect, met with on the margins of pools and amongst the froth and *débris* of flooded creeks.

LUCANIDÆ.

The comparatively dry climate of the Mallee regions seems to be a barrier to the members of this family, with the excep-

tion of two species, which are found under logs, both common and widely distributed, viz. :—

1974. *Figulus lilliputanus,* Westw.
1976. *F. regularis,* Westw.

The handsome "Golden Beetle" (*Lamprima rutilans,* Er.), common from the Dividing Range to the coast, I have taken at the northern end of the Grampians, which is probably about the limit of its north-westerly range in Victoria.

SCARABÆIDÆ.

Of this large and important family, the headquarters of which is in the moist and cool forests south of the Dividing Range, the Mallee district has not many genera or species. A few rare ones are met with occasionally, while the small, brown, hairy beetles belonging to the genus Liparetrus sometimes swarm in thousands in the early summer, stripping the tops of the eucalypts of their foliage, the noise of their wings resembling that of a swarm of bees.

Onthophagus pontilis, Blackb.
O. victoriensis, Blackb.

A small black "burying beetle" with striate elytra. The male has two curved horns springing from the hind margin of the head.

2033. *O. cuniculus,* Macl.

In this species the elytra are shining black, with rows of large punctures. The head and prothorax are of a metallic coppery green. My specimens are from Mildura.

2085. *Aphodius granarius,* Linn. Introduced species.
2087. *A. lividus,* Oliv.
Bolboceras chelyum, Blackb.
2107. *B. cornigerum,* Macl.
B. sloanei, Blackb.
B. taurus, Blackb.

These interesting beetles are very distinctive in appearance. The males have the head, or both head and prothorax, armed with horn-like appendages. They are strongly built, convex, with rounded, striate elytra, and of a reddish-brown colour. Where fences are being erected these and other insects are often trapped in the post-holes left open during the night, and many are taken in flood-waters.

2131. *Trox australasiæ,* Er.
T. velutinus, Blackb., var.
2150. *Liparochrus geminatus,* Westw.
2176. *Phyllotocus macleayi,* Fischer.
Mæchidius crenaticollis, Blackb.
Psammodius zietzi, Blackb.
Liparetrus bituberculatus, Macl.

2277. *L. iridipennis*, Germ.
2287. *L. phœnicopterus*, Germ.
L. squamiger, Macl.
L. villosicollis, Macl.
L. læticulus, Blackb.
Haplonycha amœna, Blackb.
H. firma, Blackb.
H. laminata, Blackb.
Pachygastra tasmanica, Germ.
Othnonius batesi, Oll.

A rare species. In February, 1904, near Morton Plains, I took several specimens feeding (during the day) on a species of Helichrysum (?) It is three-quarters of an inch in length; the head, prothorax, and scutellum black, elytra castaneous, with two conspicuous costæ on each.

2317. *Scitala rorida*, Burm.
Pentodon australis, Bl.
Isodon pecuarius, Beiche.
Cheiroplatys accedens, Bl.
2476. *C. mœlius*, Er.
Neocavonus bidens, Blackb.
N. niger, Blackb.
2505. *Cryptodus caviceps*, Westw.
2519. *C. piceus*, Germ.

The species of Cryptodus are moderate-sized, dark brown, somewhat flattened beetles, with costate elytra. They have the mouth parts ingeniously protected. It is probable that all frequent the nests of ants. Mr. Lea mentions having taken a pair of *C. caviceps* on a nest of the "Meat Ant," *Leptomyrmex detectus*. On digging up three small nests of this ant I obtained ten examples of *C. caviceps*. Some were in the wide galleries near the surface, others deep down in the nests. They fly by night, often coming indoors, attracted by the light.

Semanopterus concentricus, Blackb.
S. distributus, Blackb.
S. rectangulus, Blackb.

Several species of the genus Heteronyx occur here, but, as these are very difficult to identify with certainty, and I understand Mr. A. M. Lea is engaged on a "revision" of the genus, it will be best not to deal with them at present.

CORRECTIONS.—On page 97 of last *Naturalist* "Bell-Miners" should read "Bell-birds." On page 104, "*Hakea rigida*" should read "*H. rugosa*" (see text, page 103). On page 107, the name of Mr. F. Keep, Canterbury, should have been included among those who contributed garden-grown Australian flowers.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th December, 1919. Mr. J. Gabriel, one of the vice-presidents, occupied the chair, and about sixty members and visitors were present.

REPORTS.

A brief report of the excursion to Frankston on Saturday, 15th November, was given by Mr. C. Daley, F.L.S., who kindly acted as leader in the absence of the leader, Mr. J. Johnstone, owing to a sudden family bereavement. The forest plantation, which consists chiefly of various species of pines, was the object of the excursion, and after this had been inspected a general ramble over the heath ground took place, but nothing of particular interest was noted.

A report of the excursion to the Fitzroy Gardens, East Melbourne, on Saturday, 29th November, was given by the leader, Mr. J. Stickland, who said that there had been a fair attendance of members interested in pond life, the object of the excursion. Specimens of many kinds were very numerous, and a quantity of material was secured for home examination.

A report of the excursion to Belgrave on Saturday, 6th December, was given by the leader, Mr. F. Pitcher, who said that there had been a good attendance of members, who enjoyed the outing very much, the weather being extremely pleasant. The excursion had been arranged for the study of ferns, for which the neighbourhood is well suited. Some twenty species were noted, but none were of particular rarity. Delightful views were obtained in many parts, particularly over the district known as "The Patch," and across to the Warburton Ranges. One member who devoted himself to entomology did very well in micro-coleoptera, while the ornithologists were gratified by hearing the Lyre-birds more than once.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Dorothy Best, 211 Brunswick-street, Fitzroy: Dr. Chas. Albercione, Box 599, G.P.O., Melbourne; Rev. Ernest Davies, 90 Liddiard-street, Hawthorn; and Mr. Stanley A. Lawrence, "Miya," Alma-road, East St. Kilda, were duly elected as ordinary members, and Mr. C. G. L. Gooding, "Myrtle Vale," Moe, as a country member of the Club.

GENERAL BUSINESS.

Mr. Chas. Barrett expressed dissatisfaction at the amount

of time occupied at the monthly meetings by the presentation of excursion reports, often to the exclusion of more interesting matter. He considered the papers read were not of sufficient scientific interest, and thought the committee should arrange for papers on more important subjects.

Mr. E. E. Pescott, F.L.S., said that there was something in what Mr. Barrett had put forward, and suggested further consideration at another meeting. Messrs. E. Cox, F. E. Wilson, and H. B. Williamson also spoke, the latter urging members to specialize more.

The chairman said the committee would be only too glad if members would come forward with papers on subjects other than botany.

REMARKS ON EXHIBITS.

Mr. E. E. Pescott, F.L.S., called attention to a series of plant exhibits sent by Miss C. C. Currie from Lardner, including flowering specimens of *Drosera binata* and several orchids. These had been obtained from a patch of ground burnt over some time ago, and now intended to be put under cultivation. The orchids were particularly interesting, and included some rare species.

PAPER READ.

By Messrs. G. Weindorfer and G. Francis (communicated by Dr. C. S. Sutton), entitled "Wild Life in Tasmania."

The authors dealt with some of the larger forms of life met with in the Cradle Mountain district, such as kangaroos, wallabies, wombats, &c., and mentioned several interesting facts regarding them.

Owing to the lateness of the hour, the conclusion of the paper was deferred to another meeting.

Mr. F. Wisewould took exception to the statement that kangaroos are generally separate, his experience of Victorian kangaroos being that they are always to be found associated in groups.

Mr. G. A. Keartland said that when the Club excursion party was at King Island in 1887 the Short-tailed Wallaby was found in droves, while the Black-tailed species in Victoria was always found singly.

NATURAL HISTORY NOTES.

Mr. G. A. Keartland said the White-browed Wood-Swallows were very common at present, and he took it as an indication of a warm season.

Mr. J. Gabriel instanced the case of a Swallow which had built a nest on a cricket ball on a shelf.

Mr. E. E. Pescott related a case in which Swallows had brought out a clutch of young birds from a nest built in a nail

box on a carpenter's bench, though the bench was constantly in use.

EXHIBITS.

By Mr. F. G. A. Barnard.—Flowering specimens of Potato Orchid, *Gastrodia sesamoides*, from Tourist Track, near Menzies Creek, Dandenong Ranges.

By Mr. Chas. Barrett.—Caddis-fly cases built of different aquatic plants; photographs of axolotl, water-bug, &c., by Mr. H. M. Hale, South Australian Museum.

By Miss C. C. Currie.—Collection of peat-loving plants from Lardner, Gippsland, including *Utricularia dichotoma* and *U. lateriflora*, *Drosera binata*, *D. pygmæa*, the orchids *Prasophyllum intricatum*, *P. album*, *P. australe*, *Microtis porrifolia*, and *Burnettia cuneata* (in fruit); also the ferns *Schizæa bifida* and *Gleichenia circinata*.

By Mr. F. Cudmore.—Ribbon slate (Lower Cambrian) from Tapley Hill quarry, near Adelaide, S.A.; glacial conglomerate (Lower Cambrian) from Grey Spur, Inman Valley, about nine miles from Victor Harbour. The Grey Spur rocks form a scarp 150 feet high, resting unconformably on Pre-Cambrian rocks on the eastern side of the valley. This valley was subjected to glaciation in Permo-Carboniferous times, when Selwyn's Rock was striated.

By Mr. J. E. Dixon.—Fifty-two species of coleoptera from Lake Hattah district, N.W. Victoria.

By Miss M. T. Johnson.—Flowering specimens of *Blandfordia flammea*, Christmas Bells, and *Ceratopetalum gummiferum*, Christmas Bush, from Sydney, N.S.W.

By Mr. F. Keep.—Flowering branches of *Leptospermum scoparium*, variety with weeping habit, and flowering in summer; also flowers of *Eucalyptus pyriformis*, the Pear-fruited Gum of Western Australia—both grown at Canterbury.

By Mr. C. Oke.—Micro-coleoptera collected at Belgrave excursion, including three specimens of two species of Chlamydopsis—the beetles belonging to this genus inhabit ants' nests and are extremely rare and difficult to secure.

By Mr. E. E. Pescott, F.L.S.—Christmas Bells, *Blandfordia grandiflora*, from Port Stephen, N.S.W.

By Dr. C. S. Sutton.—Skins of opossums, *Trichosurus vulpecula* and *T. fuliginosus*, from Cradle Mountain, Tasmania, in illustration of paper by Messrs. Weindorfer and Francis.

By Mr. J. Stickland.—Leaves of Maidenhair Tree (Ginkgo), from Fitzroy Gardens.

By Mr. L. Thorn.—Marine shells, *Cynatium spengleri* and *Haliotis nævosa*, also seaweeds, from Phillip Island and Flinders; larvæ in various stages of the Wood White Butterfly, *Delias aganippe*, Don, with pupæ and perfect insect.

By Mr. H. B. Williamson.—Specimen of *Isopogon anemonifolius*, R. Br., "Tall Cone-bush," collected by Mr. T. S. Hart, M.A., near Bairnsdale, previously doubtfully recorded for Victoria.

After the usual conversazione the meeting terminated.

EXCURSION TO NOBELIUS'S NURSERY, EMERALD.

About twenty members and friends took advantage of the Cup Day holiday on Tuesday, 4th November, to visit the famous tree-nursery of Messrs. C. A. Nobelius and Sons at Emerald. Near Belgrave station the clumps of the introduced Tree Heath, *Erica arborea*, were noticed growing very strongly. All along the line the beauty of the red—and in some places scarlet—of the young foliage of the gums was very noticeable. The party was met at the station by our fellow-member, Mr. W. Scott, who now lives at Emerald, and by Mr. Barnard, who had walked up that morning from Belgrave. The natural fern gully in the nursery is still as beautiful as ever; and among the ferns and native trees Mr. Nobelius has planted Hydrangeas, Maples, Japanese Iris, Rhododendrons, and Azaleas, all of which are growing finely. In the lower parts of the gully and along the creeks the English Buttercup, *Ranunculus repens*, has become naturalized, and the golden flowers were very abundant. Near the top of one of the tree-ferns, which was fully fifteen feet in height, a considerable clump of the Green Bird Orchid, *Chiloglottis Muelleri*, Fitz., was discovered. A small boy, cousin of Miss Nethercote, climbed the tree-fern, and so collected specimens for the party. The exotic trees in the nursery were probably at their best, owing to the spring growth being so fine, and also to the fact that a recent rain had brightened everything up. The trees which were more admired than any others were the Purple and Copper Beeches, of which there were many nursery rows. The glorious tints which these young trees presented, ranging from a rich copper-red, almost crimson, down to a deep purplish-black, combined with the dainty pendulous habit of the young growths, were the admiration of the whole party. In one small unoccupied portion of the nursery grounds a profusion of growth of *Tetratheca ericifolia* and *Bauera rubioides* was abundantly in bloom, the latter being particularly fine. The feature of the nursery, however, was the establishment of the flax industry, many acres of land being devoted to the culture of the New Zealand Flax, *Phormium tenax*. Mr. Nobelius is to be congratulated on his enterprise, and it is to be hoped that the industry will rapidly extend in the Commonwealth, and that it will be a profitable one to the originator.

A flax mill has been installed, and the manager was most courteous to our party, showing and explaining every operation. The flax plants are ready to cut at three years old, and subsequently every three years for an indefinite period. The leaves are graded according to length by an ingenious and yet simple method. A bundle of the leaves is dropped into a cask sunk into the ground. The longest leaves are bunched out first as grade 1, then the second longest are taken out for grade 2, leaving the balance for grade 3. The grades are passed into the scutching machine, which, in the space of about a second, very cleverly and forcibly removes both upper and under surfaces of the leaves, reducing these surfaces to a coarse powder, leaving the leaves on the floor a heap of green fibre. This fibre is passed between revolving rollers under water, which process washes out the gum-like sap. It is then dried and bleached for three weeks by laying it out on grass. The fibre is then ready for baling and for despatch to the rope mills. The powdery leaf surfaces are washed into a drain, the sediment being cleared out from time to time for use as a medium for raising young flax seedlings and for manure in the nurseries. Millions of young flax seedlings, looking just like young seedlings of grass, are being raised at the present time in the nursery for planting out so as to increase the area of flax. It was very interesting to be told by the manager that while it took from eight to ten tons of leaves to produce a ton of fibre in New Zealand, the same amount of fibre was being produced here from seven tons of leaves ; that in New Zealand the best flax grew in swamps, while all of Mr. Nobelius's was hill-grown ; and that every sample of local flax fibre was graded at the rope mills as " special." Leaving the nursery at about 4 p.m., the party was entertained at afternoon tea, in his mountain home, by Mr. Scott. Our old and esteemed member has succeeded in establishing in his garden paddock quite a number of terrestrial orchids, including *Thelymitra longifolia, Prasophyllum brevilabre, Microtis porrifolia, Dipodium punctatum,* and others, and these were much admired by the party. Leaving Mr. Scott's home we walked to the tourist track along the Menzies Creek, finding our way ultimately to the Paradise station, along the tourist track. In some of the glades the great clumps of the Silver Wattle were very fine, and in full seed. At flowering time the sight must have been gorgeous. The creek scenery, the tree-ferns, the musks, clematis, asters, and other beauties were greatly admired, the time being all too short to allow us to spend much time there. From the creek to the station at Paradise is a fairly stiff hill climb, being about 300 feet. Two entomologists were among the party, who made some very interesting captures.—E. E. Pescott.

A GIRLS' CAMP AT THE NATIONAL PARK (WILSON'S PROMONTORY).

By (Miss) G. Nethercote.

(*Read before the Field Naturalists' Club of Victoria, 13th Oct.*, 1919.)

Despite foreshadowings of sand-flies, snakes, and sharks, Saturday, 18th January, 1919, saw our party of eleven bound for a ten days' camp at the National Park. Leaving town by the 7.40 a.m. train for Bennison (113 miles), a little town on the Franklin River, our journey so far was uneventful. Our tents, bedding, and provisions accompanied us, with the exception of bread, which was picked up at Foster *en route*. A formidable pile it looked, packed in sacks and piled on a trolly; but eleven hungry people, without the chance of replenishing their larder for ten days, required a substantial supply.

Here I'll pause for a moment and side-track on provisions. Our biggest problem was bread. Meat, milk, vegetables, and fruit could be taken tinned or in dried form. Would our bread keep? Of course, it would be stale long before ten days had passed; but, worst of all, would it become blue-mouldy? We had it packed in new flour-bags, except one lot, which was unfortunately put into a previously-used bag. On arrival at camp these were placed on waterproof material, so that no moisture should be drawn into the bags from the ground, and covered with similar material, so as not to dry too quickly. Although dry at the end, it all kept well except the lot in the previously-used bag, which, somewhat early, decorated itself with blue.

At Bennison, three miles beyond Foster, we left the train, and were told an hour was at our disposal before the tram left for Port Franklin. The day was hot and sultry, and the country flat and treeless. A store some little distance from the station was visited. A wee damsel in charge informed us, "Father charges 3d. for limejuice if you have water in it." The limejuice lasted three glasses, then gave out. As the price of water was not known, it was not passed round. We returned to the station to find our luggage piled on a large trolley, with sides like a hay-waggon; this, to our surprise, we found was the Port Franklin tram. However, it proved a novel and convenient conveyance, and, drawn by a pair of horses, we soon covered the mile and a half to the Franklin River landing. A wide stream confronted us here, which, we soon learned, was to our disadvantage, as one must leave on low tide and reach the Park on the full, otherwise the boat cannot get alongside the landing-stage. Sitting on the wharf with fishing-lines, we saw the wide stream gradually shrink to a tiny silver ribbon running through wide mud-flats swarming

with thin, red, spidery crabs, *Helœcius cordiformis*. Port Franklin is a small fishing village, but our only catch was a rusty jam-tin. A strong south wind now rose, and our boatmen promised us a cold, wet crossing, or, as an alternative, the use of the ranger's cottage (put at our disposal by the ranger) for the night. The latter was accepted, and an early start made the following morning. The launch was capable of holding thirty-two, so eleven and luggage were easily stowed on board. Soon we were sliding down between the flat mud-banks of the Franklin River. The surrounding mangrove swamps and mud ridges form a perfect paradise for water-birds of every description, which were there in hundreds. Leaving the river, a south-westerly course was set across Corner Inlet, passing quite close to Doughboy Island. Mount Singapore, the scene of the prospecting for tin at present being carried on, was visible to the south-east.

By noon we were at the Park, landing at the south-west corner of the Inlet, where we found the ranger, Mr. Cripps (who proved our best friend throughout the trip), awaiting us with buggy and horses to convey us to the Darby River, where we intended making our camp. Here is situated the first rest-house, a two-roomed galvanized iron structure. The track to the Darby River follows the easiest route, and is sometimes outside the Park. At first we followed the sandy track inside the high vermin-proof Park fence. The country was unusual ; gum-trees were scarce, Banksias or honeysuckles and grass-trees forming the main features of the vegetation. Parallel with our track on the left was the Vereker Range, boasting of good timber and fine fern gullies. Presently the heavy sandy track passed through No. 1 gate, amidst low, scrubby country. Descending into a hollow before re-entering the Park, we saw in front of us a number of half-dead gums. Imagine our delight on getting nearer to find them tenanted with native bears, or koalas—not one, but many.

It was from this spot our camp mascot, soon known as a Dincombe Teddy bear, with fuzzy-wuzzy ears, was taken. He was a small grey beastie with a white shirt-front. At first he was fed on condensed milk with a teaspoon, a serviette being tied round his neck to catch the half that did not go into his mouth. Later we found he was old enough to eat gum leaves, and, although it was a couple of miles to the nearest trees from the camp, he was never found wanting his leaves.

Re-entering the Park by No. 2 gate, we found a few of the beautiful white Butterfly Iris, or Tangil Lily, *Diplarrhena Moræa*, in flower. From here the Vereker Range presented a fine view. Again passing out of the Park by No. 3 gate and rounding a hill, we saw below us the Darby River, and our

luggage awaiting us. On the lee side of some tall tea-tree on the north side of the Darby our three tents were soon erected —two sleeping and one dining tent, in which the provisions were also stored. But the majority of the time, owing to ideal weather, our morning and evening meals were eaten under the shade of some fine Silver Honeysuckle trees, *Banksia marginata*. A low, rude table was constructed, and a white table-cloth made it look homely. Each one produced her own table requirements—two plates, two knives, forks and spoons, and one mug. The provisions were opened up ; bread, butter, honey, and jam made their appearance, and were placed on the table, while the billy boiled, and thus the first of our many happy camp meals was made.

Across the river could be seen the other rest-house, the trustees' cottage, and the ranger's house. A fine bridge connected us with the Park, and a few minutes' walk or swim took us to the mouth of the Darby River. The south bank ends in a granite headland, but the northern is soft dune rock, fast crumbling away and helping to make the sand-bar at the mouth of the stream. North of this is a long, uninterrupted beach, over which vehicles can be driven at low tide, to eventually pick up a road to Fish Creek, on the railway. Directly back from this beach are endless kitchen middens, the feasting-places of the aboriginals in days gone by. What countless numbers of our fast-diminishing natives must have frequented this spot to leave such high mounds of broken shells ! Some of our time was spent here, and a number of axes, tomahawks, needles, spear-heads, &c., found. Two Pearly Nautilus shells were also found in the neighbourhood.

From the Darby River a track runs behind the ranger's cottage to Tongue Point, where some successful fishing was done from the granite boulders.

During the week it was decided to visit some of the fern gullies further south, and, if possible, Sealers' Cove. This necessitated taking a tent, bedding, and provisions for three days ; so one of the Park horses was commandeered. The narrow sandy track led round the foothills and over the Darby Saddle—the first heavily-timbered country (Messmate and White Ironbark) we had passed through. Fine coastal views were obtained in places. Whisky Creek was our first water. The track then led through heathy country—a splendid botanical collecting-ground earlier in the season. A few plants, such as *Correa alba*, Hibbertia, sp., *Gompholobium Huegelii*, *Epacris impressa*, *Convolvulus erubescens*, were found in flower. At about seven miles we left the main track and turned east into Lilly-pilly Gully. After the country just passed through, this was a surprise. The tree-ferns were very fine, and few of us had

seen Lilly-pillies, *Eugenia Smithii*, growing so freely before. The fallen tree-trunks, also the stems of the tree-ferns, were festooned with climbing ferns, principally *Polypodium pustulatum*, syn. *P. scandens*. Here also Blackwoods, *Acacia melanoxylon*, Sassafras, *Atherosperma moschata*, Hazel, *Pomaderris apetala*, and Blanket-trees, *Bedfordia* (*Senecio*) *Bedfordi*, abounded. Rejoining the main track, we continued on, crossing the Tidal River, with Bishop Rock on our left—an unusual formation, the rocks appearing to have water running over them—and formed our camp on the Titania Creek, at the foot of the Telegraph saddle, amid fern-trees and other luxuriant vegetation.

The next day Sealers' Cove, seven miles distant, was visited. Ascending the Telegraph saddle, a cleared track runs east along the side of the range. Several rocks, forming an arch, were early passed under. At one point a fine view, with portions of the east and west coasts of the Promontory in sight at the same time, was obtained. The track ran above and through fine fern gullies—the principal tree-fern being the graceful *Cyathea Cunninghami*, with its thin, black stems, sometimes 40 or 50 feet in height—finally picking up an old sawmill tramline, and crossing Sealers' Creek amid a wealth of Lilly-pillies and other trees, ends at the beach, where some of the old sawmill jetty still remains. Shells were picked up on the beach, among them a Paper Nautilus. Pockets were filled with tiny pointed shells, which later, round the camp-fire, were threaded in strings as mementoes. One of our party, Mrs. Hamilton, had some twenty years before been on board a steamer bound for Sydney which had been compelled by stress of weather to take refuge in Sealers' Cove, and great was her delight at revisiting the spot under much pleasanter circumstances.

A tired but satisfied party reached Titania Creek camp that evening, and turned in early. Next morning found us early astir. The rolling of bedding and tents ready for the horse was quickly accomplished, and soon we turned our backs on Titania Creek and its fern glades for the last time. It was interesting to note that many of the ferns here possessed tufted fronds. The main object of the day was to reach the west coast and follow it as far as possible in a northerly direction, then to pick up the Darby track and so regain our original camp. Leaving the track, we pushed through the tea-tree scrub, and, passing Mount Oberon, reached the shore of Oberon Bay, with its north and south headlands of solid granite. Winding over the northern headland, a steep track leads to Norman Bay, with its fine, wide, sandy beach, at the northern end of which the Tidal River enters the ocean. The sand here was heavily marked with tracks of emus, kangaroos, and wallabies. A

swim was enjoyed here by most of the party. The sand teemed with myriads of tiny red crabs, which hurriedly entered their holes on our approach.

Cutting off the northern end of Norman Bay, we approached Leonard Bay, and on the headland found the Angular Pigface, *Mesembryanthemum æquilaterale*, the large red fruit of which we found most palatable. Leaving Leonard Bay, we made inland to the main track, and so back to the Darby River camp, to find a tea of rock-cod, caught and prepared for us by the two who had elected to remain at home. Some thirty odd people gathered round the camp-fire that evening. Old camp songs were sung and stories old and new told while the billies boiled and the larder was ransacked for delicacies. A vote of thanks was passed to the ranger, Mr. Cripps, who had done so much to make the camp a success.

Next morning our last swim down the Darby, our last surf in the ocean, was taken. The camp was dismantled, and in the afternoon eleven happy, sunburnt people, hugging treasures too precious to go in the buggy as general luggage, were to be seen tracking across to the shore of Corner Inlet, there to find our boat in full sail awaiting us on the evening tide, though it was the next tide before we started for home, with "Teddy Dincombe," a wee ball of grey, entering on his first sea voyage.

Teddy Dincombe Fuzzy Wuzzy, now a year old, resides at Hawthorn, permitted to do so by a permit issued by the Fisheries and Game Department. He has doubled in size since we captured him. He has his full freedom, which sometimes he abuses; but who can blame him when a hundred or more gum-trees nod and wave their heads to him and invite him over to their side of the fence? Those who see him in the daytime or during his evening meal would get a surprise to see him racing up and down the trees and jumping from bough to bough. Sometimes he walks "Blondin" on a paling fence for a couple of hundred feet or so, then, jumping off, will gallop across an open space of several hundred feet to the nearest tree, into which he digs his claws and races up. You may go after him and call and call, but Teddy Dincombe will come down when it suits him. It may be soon, with a quick run, a few sharp snorts, and a jump, and he is on to you; or it may be a day or two later, when, tired of solitude, he will come creeping down, put his cold kid nose on to your neck, his fore-paws on your shoulder, and drop into your arms. He is fond of company, and likes being nursed. In the evening he will wander round the house until he finds someone who is sitting still; then he will climb up and go to sleep.

As regards food, he has very strong likes and dislikes.

Although he lived up a sugar gum for the first few months of his Hawthorn life, he refused to touch it—even the tender young tops—and every evening would come down and eat his full-grown gum-leaves gathered from trees along Gardiner's Creek and the Yarra. Peppermint and messmate are also his aversion, while he enjoys white gum, apple box, and stringy-bark, and (in moderation) blue gum.

I cannot say that this is the rule with all native bears, for a friend told me of one that refused any other variety than sugar gum, while another lived for three years on peppermint; but the fact remains that with Dincombe you can mix the varieties and he will carefully go over them, and eat the same kinds each time; or, if you give him nothing but sugar gum and peppermint, you will find them untouched, and a sulky Dincombe will look at you from the fork of a tree above, or he may run down and dig his two front teeth into your shoulder to announce the fact that he is hungry, and that the gum-leaves in the tin are suitable only for table decoration—as food they aren't fit for bears. Since leaving the Promontory he has lived entirely on gum-leaves, and has never taken any fluid.

The toes on the hind feet differ from those on the fore feet, which have five toes, with a claw on each. The hind feet have the same number of toes, but the fourth is double, with two claws, the fifth toe having no claw.

When first caught he had the curious sharp yap of a baby bear, but during the last couple of months the grown-up grunt has been developing, usually in a drowsy condition after a good meal, when he will point his nose skywards and begin like a subdued snore; it becomes louder and louder until, as someone said, it rumbles from the very soles of his boots.

Koalas are not such senseless little animals as they are supposed to be. He is quick in picking out direction and alteration, while back will go his ears and up the tree he will go like a shot at the sound of a strange voice, while a call from us will bring him trundling down. There is quite a lot one could tell about his funny ways. Ah! here he is, climbing up the back of my chair on to my shoulder. I must go and get him some tea, else the busybody poke-nose of his will be in the ink.

[The paper was illustrated by a large series of lantern views. It may be useful for reference to record here previous articles in the *Naturalist* on Wilson's Promontory:—April, 1905, xxi., p. 128 (history); April, 1906, xxii., p. 191 (camp-out, with illustrations); Feb., 1909, xxv., p. 142 (with map); Jan., 1910, xxvi., p. 129; Jan., 1911, xxvii., p. 178; March, 1911, xxvii., p. 208; May, 1913, xxix., p. 163 (with illustrations); and Feb., 1915, xxxi., p. 143.—ED. *Vict. Nat.*]

"The Gum Tree."—The December issue of this journal contains the first portion of an illustrated article on "The Pines of Tasmania," by Mr. G. Weindorfer, of Cradle Mountain, which gives some interesting particulars of the life-history of the King William Pine, *Arthrotaxis selaginoides*, Don, which, on account of its slow growth, seems to be doomed to extinction at no distant date. Articles on forestry in Western Australia, the kiln seasoning of timber, and forestry in Portugal, with references to the destruction of forests in France by the recent Great War, help to make up a very interesting number of this publication.

Commonwealth Military Survey.—Another map of the Victorian series has recently been issued. It is entitled "Corangamite, Beeac, Cobden, and Colac," and is on the smaller scale of ½-inch to 1 mile, which is quite sufficient for such comparatively flat country. It embraces the towns of Winchelsea, Birregurra, Cressy, and Camperdown, as well as those named in the title, and, in addition to the huge Lake Corangamite, shows some twenty-five other lakes of varying sizes. The parts visited by the Club excursion of Easter, 1918, are, of course, included, but the omission of the name of the well-known hill near Alvie, known as "Red Rock," must be regarded as a distinct oversight. The southern portion of the map, by the tortuous contour lines, indicates the nearness of the Otway Ranges. It is issued at the same price as those of the larger scale—viz., one shilling.

Geelong Field Naturalists' Club.—This Club, which, under many disadvantages, has made a strong fight to keep natural history before the citizens of Geelong for a number of years, held its first exhibition of wild-flowers at the Gordon Technical College on Saturday, the 4th of October last. The exhibition was enthusiastically supported by the public, and proved a great success. In addition to representatives of the district flora, flowers were received from the Grampians and Gippsland, most of which were displayed with both scientific and vernacular names. The president, Dr. M'Callum, in opening the exhibition in the afternoon, expressed the society's thanks to Melbourne friends for help in the venture, and in the evening the mayor, Mr. H. Hitchcock, who is an enthusiastic horticulturist, said that the beginning now made should result in a greater interest in Australian plants suitable for cultivation in our gardens.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th January, 1920.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about fifty members and visitors were present.

REPORTS.

A report of the Christmas excursion (24th–29th December) to Loch Valley was given by the leader, Mr. F. G. A. Barnard, who said that, notwithstanding some wet weather, the party had enjoyed the outing very much. They had got as far as Mount Horsfall, and seen the wonderful trees of the district, which, it is expected, will within twelve months be in the grip of the sawmiller. They had also visited Nayook Glen, a beauty spot worth anyone's while to see.

Mr J L. Robertson, M.A., said that, as a member of the party, he wished to thank the leader for the trouble he had taken in arranging the details of the outing. The fine trees at Mount Horsfall had been a revelation to him. Some rough measurements he had made gave heights of 120 to 180 feet to the first branch. He asked if anyone could give any information as to the effect of electricity on the growth of trees.

Mr. D. Best said that the report appeared to him to be an account of a mere pleasure jaunt. Little natural history collecting or observation could be done when distances of ten and twelve miles, as mentioned, were covered in one day. He would like to know if any Bursaria was found in bloom, and whether any beetles were collected.

Mr. F. Wisewould thought the report a very interesting one, and formed an excellent groundwork for future visits to the district.

Mr. A. E. Keep, as a member of the party, said that he did not consider natural history had been neglected. His experience was that the leader took every pains to name and explain any object submitted to him.

Mr. J. H. Harvey considered the report a very informative one, and just what was wanted for a new district.

The chairman said that he understood the excursion to be a sort of pioneering one, and the authorities at the Tourist Bureau were waiting to hear the experiences of the party.

Mr. Barnard, in answer to Mr. Best, said that the Bursaria along the Loch Valley was just coming into bloom, but on

account of the showery weather no beetles seemed to be frequenting it. He intended to give a little more detail when printing the report, though the country traversed differed but little from Warburton or the Dandenong Ranges.

GENERAL BUSINESS.

Mr. A. E. Keep asked whether the Club was doing anything in support of the movement to make Macquarie Island a sanctuary for sea elephants, seals, penguins, &c.

Mr. J. A. Kershaw, F.E.S., said that the matter is in the hands of the Commonwealth Government, and that at present negotiations were in progress with the Tasmanian Government for the transfer of the island.

Mr. F. E. Wilson said that Mr. J. Hatch, the lessee of the island from the Tasmanian Government, is working hard to secure his rights.

On the motion of Messrs. C. L. Barrett and J. Gabriel, a resolution was carried expressing the opinion of the Club that Macquarie Island should be set aside as a sanctuary for birds, &c., and that no license to obtain penguin oil should be allowed.

The chairman announced that Mr. E. E. Pescott, F.L.S., had offered to act as hon. secretary until the next annual meeting.

PAPER READ.

Dr. C. Sutton read the conclusion of Messrs. G. Weindorfer and G. Francis's paper on "Wild Life in Tasmania," which had been held over from the previous meeting.

This portion of the paper gave interesting accounts of the Ring-tailed Opossum, Tasmanian Brush Opossum, Tiger Cat, and Common Native Cat; also some notes about the Sooty Crow-Shrike or Black Jay.

NATURAL HISTORY NOTES.

Mr. F. Wisewould asked what had become of the Starlings this season. In his district (Pakenham Upper), where they usually caused much destruction of fruit, the fruit had not been touched.

Mr. J. Gabriel said that Starlings will not touch fruit if they can get caterpillars, which have been very plentiful lately.

Messrs. G. A. Keartland and F. Chapman said that in their districts (Preston and Balwyn) the Starlings were as destructive to fruit as usual.

Mr. F. G. A. Barnard said he was exhibiting a live specimen of the large native Black Snail, found during the Loch Valley excursion, and asked if any member could suggest a food plant for it. He had tried thistles and lettuce leaves, but neither

seemed to be appreciated. He wished the introduced snail, *Helix aspera*, were as abstemious in its habits. Mr. C. Oke said he had seen one eat the leaves of the common Arum.

EXHIBITS.

By Mr. Chas. Barrett.—Specimens of a land shell, Helix, sp., from excavations close to the Pyramid of Cheops, Egypt.

By Mr. F. G. A. Barnard.—Live Black Snail, *Paraphanta atramentaria*, from Noojee ; coarse-grained granite from Nayook Glen ; also maps and photographs illustrating Loch Valley excursion.

By Mr. F. Chapman.—Electrotype cast of " Dudley Locust " (Calymene), a trilobite long mistaken for an insect, illustrating the fact that electrotypes can be made direct from fossils.

By Mr. T. S. Hart, M.A.—Flowers and mature fruits of previous season on same branch of *Acacia implexa*, from Wheeler's Hill ; also larvæ of the Apple-tree Hanging Moth, *Charagia lignivora*, ringbarking stems of *Leptospermum scoparium* and *Acacia verticillata*, from Scoresby. The larvæ work under a protecting cover of web and sawdust while making tunnels in the stems of the shrubs.

By Mr. C. A. Nethercote.—Bunch of Spotted Orchids, *Dipodium punctatum*, from Silvan (South Wandin).

By Mr. E. E. Pescott, F.L.S.—Specimens of Long-leaved Tongue Orchid, *Cryptostylis longifolia*, R. Br., from Ferntree Gully.

By Mr. J. Searle.—Specimens of a parasitic Isopod belonging to the family Cymothoidæ of the sub-order Flabellifera, found in the intestine of a parrot-fish. The young of this family, when hatched from the egg, are free swimmers, and all the individuals are at this stage males. They fix on to and fertilize the adult parasites. Subsequently these become parasitic and develop into female, and are in their turn fertilized by the larvæ derived from a previous generation (*vide* " Cambridge Natural History ").

By Mr. L. Thorn.—Larvæ of the Cup Moth, *Limacodes longerans* (*Doratifera oxleyi*), White, in various stages, also the pupa and perfect insect ; six species of Victorian Cicadas—*Cyclochila australasiæ*, Don., *Psaltoda niocreus*, Ger., *Melampsalte denisoni*, Dis., *M. abdominalis*, Dis., *M. murrayensis*, Dis., and *Pauropsalta encaustica*, Dis.

By Mr. J. Wilcox.—Flowering branches of New South Wales Christmas Bush, *Cerapetalum gummiferum*, grown at Camberwell.

By Mr. F. Wisewould.—Flowers of *Lomatia ilicifolia*, *Dianella tasmanica* (fruits), *Dipodium punctatum*, and *Xanthorrhœa minor*, from Pakenham Upper.

After the usual conversazione the meeting terminated.

EXHIBITION OF WILD-FLOWERS.

MEMBERS will be pleased to learn that the exhibition of wild-flowers, held on 30th September last, resulted in a profit of £163 14s. 11d., being £22 12s. 2d. more than that of the previous one. The receipts were made up as follows:—Admissions, £160 3s. 2d., and sales of flowers, &c., £55 4s. 1d., while the expenses amounted to £52 2s. 4d. As intended, the profit was divided by handing £81 17s. 6d. to the Victorian branch of the Returned Sailors and Soldiers' Imperial League of Australia for the Anzac House Fund, and depositing £81 17s. 5d. in the Savings Bank as a fund for publishing a list of popular names for Victorian plants.

In acknowledging the receipt of the amount above named, the secretary of the League says:—"It is indeed gratifying to know that your Club is displaying so keen an interest in the welfare of our returned soldiers, which fact is in itself proof conclusive that you are a representative body of loyal citizens who are striving by every possible means to reward those who made sacrifices for the whole of the Empire."

The best means of carrying out the intention of publishing the popular names of Victorian plants is now under consideration by the Plant Names Committee of the Club, who will be pleased to have suggestions in writing from those interested as to the form such a list should take, and the details which might be embraced in it.

EXCURSION TO FITZROY GARDENS.

ON Saturday afternoon, 29th November, a party of members visited the Fitzroy Gardens, for the first time as a Club excursion, for the purpose of seeing what life the various fountain-ponds and other pools would afford. The Curator of the Gardens had kindly arranged that Mr. Reeves, the foreman, should accompany the party round the Gardens and enable the members to secure what specimens they desired. A fountain-pond near Clarendon-street, which had apparently been undisturbed for some time, was first visited. Here we found quite an extraordinary quantity of the beautiful polyzoan, *Plumatella repens*, occurring on the under surface of the Nymphæa leaves. All the older leaves examined bore fine dendriform colonies, in some cases practically overspreading the whole surface of the leaf. On examination under the microscope numerous statoblasts (reproductive bodies) were found to be present. In the material collected at this pool Mr. J. Wilcox was fortunate enough to find the elegant and decidedly uncommon rotifer, *Stephanoceros eichhornii*. It is somewhat remarkable that of the four localities where this rotifer has been found by us three have been ornamental ponds

in public gardens—viz., the Botanic Gardens, the Horticultural Gardens, and now Fitzroy Gardens. We next visited the lake on the western side of the Gardens, finding there Duckweed, *Lemna minor*, in considerable quantities. This plant is a favoured habitat of the Vorticellidæ, and the present occasion provided no exception to the rule. As the afternoon was decidedly warm, we gladly accepted Mr. Reeves's invitation to afternoon tea at his lodge. While there we were able to see a fine dining table made by our host from red gum trees cut down in the Gardens, which exhibited the great beauty of the wood, and its suitability for such purposes. The excellent results obtained during the afternoon make one wish that those in charge of our public reserves could be induced to set aside portions of the pools contained in most of them, wherein the vegetation could be allowed to remain undisturbed, and thus provide sanctuaries for the microscopic fauna and flora of the Melbourne district, the natural lagoons near the metropolis having in many cases been drained and thus lost as collecting-places for the microscopist. In connection with the examination of the infusorian, *Ophryoglena atra*, under the microscope, a rather interesting occurrence may be mentioned. In order to quieten the too great activity of the creature, Epsom salts was introduced into the water, apparently in too great an amount, for a profuse discharge of the trichocysts with which this protozoan is armed took place, when the creature's appearance put one in mind of the "fretful porcupine" with quills erect.

The following are the forms noted :—

Algæ.—Bacillarieæ.—The genera Cymbella, Gomphonema, Cocconema, Synedra, Navicula, Surirella, and others were represented. Desmidiaceæ.—Closterium lunula, C. setaceum (?), Cosmarium, sp., Pleurotænium, sp. Other algæ noted were Spirogyra, sp., Pediastrum boryanum, P. duplex, and Scenedesmus quadricauda.

Protozoa.—Rhizopoda.—Amœba (sp. ?), Arcella vulgaris, A. dentata, Difflugia acuminata, D. sp., Centropyxis aculeata, C. ecornis. Heliozoa.—Clathrulina elegans. Flagellata.—Trachelomonas hispida, T. armata, Phacus longicaudus, P. triqueter, Euglena viridis, Gymnodinium fuscum, Anthophysa vegetans, Volvox, sp., Astasia tricophora, Dinobryon sertularia. Infusoria.—Platycola longicollis (?), Ophryoglena atra, Paramecium aurelia, Euplotes, sp., Urocentrum turbo, Coleps hirtus, Stichotricha, sp., Vaginicola, sp., Spirostomum ambiguum, Stentor, sp., and others.

Vermes.—Rotifera.—Stephanoceros eichhornii, Actinurus neptunius, Furcularia longiseta, Brachionus bakeri, Melicerta ringens, Limnias ceratophylli. Polyzoa.—Plumatella repens. Gastrotricha.—Chætonotus, sp.

Cœlenterata.—Hydra oligactis.

Arthropoda—Macrobiotus, sp.—J. Stickland.

EXCURSION TO BELGRAVE.

QUITE a large party of members took part in the excursion to Belgrave (Dandenong Ranges) on Saturday, 6th December, and, favoured by a beautiful day, thoroughly enjoyed the outing. The welcome rain earlier in the week had freshened up the vegetation, and as we journeyed along by the morning train everything seemed at its best. Between Bayswater and Ferntree Gully numerous patches of the Golden Spray, *Viminaria denudata*, an almost leafless shrub or small tree belonging to the Leguminosæ, were seen to be in full bloom, reminding one of the graceful golden showers seen in fireworks displays. The Common Cottonwood, *Cassinia aculeata*, and the Shrubby Everlasting, *Helichrysum ferrugineum*, with their headlets of small white flowers, also made a fine show. Two Senecios, *S. vagus* and *S. australis*, bearing brilliant yellow flowers, and the Trigger Plant, *Stylidium* (*Candollea*) *graminifolium* (pink), added colour to the scene. The young eucalypts displayed a wealth of colour in their new growths, and were greatly admired as we gradually increased our elevation. Near Belgrave the first bushes of the Christmas-tree, *Prostanthera lasianthos*, were just coming into bloom. Belgrave, 750 feet above sea-level, is a centre from which many interesting trips can be made. We had decided on this occasion to try Hardy's Creek, situated in the State forest, about a mile from the township. This creek, by the way, is named after the late Mr. Jno. Hardy, father of our president, who made the original survey of the Dandenong Ranges in 1867. It joins the Monbulk Creek near the crescent railway bridge between Belgrave and Selby. As we walked along the line, fine growths of Blackwood, Sassafras, Silver Wattle, Native Hazel, and Christmas-tree were to be seen in the valley of the Monbulk Creek, while in the grounds of Belgrave House, close by, and in Mr. Lipscombe's garden beyond, many fine introduced European and American trees added interest to the scene. At the bridge we found a well-worn track leading to the site of a former sawmill. It had been our intention to follow up the eastern branch of Hardy's Creek, as offering the best opportunities for the study of the object of the excursion—ferns; but in the multiplicity of tracks spreading out from the sawmill we happened to choose one which eventually led us away from the creek up into the higher part of the forest. Before going further it was decided to have lunch, and in the vicinity of our resting-place luxuriant growths of many of our commoner ferns were observed, including the Batswing Fern, *Pteris incisa*, and the Leathery Shield-fern, *Aspidium coriaceum*. Our track was well defined, and, though it led away from the creek, we continued on, expecting it to strike the creek again, but

it did not, and eventually, after a walk of about two miles, reached the South Sassafras–Aura road, not far from the place marked on the tourist map as "Fine Panoramic View." On the way we had passed numerous large trees of the Giant Mountain Ash, *Eucalyptus regnans*, and many other plants and shrubs found in such localities, including the Native Elderberry, *Sambucus gaudichaudiana*, with its beautiful white blooms, which later will be succeeded by clear white fruits resembling white currants. An invitation to see the view from the garden of Mr. Drury was availed of, and was a great surprise to most of us. Some hundreds of feet below lay the district known as "The Patch"—a number of small orchards and market gardens—the various shades of green in the different crops making a delightful picture. The fine panorama included the Healesville and Warburton mountains, and, further round, the Labertouche and Beenak hills. Having missed Hardy's Creek, we decided to follow the "Patch" road to South Sassafras and visit Clematis Gully. This proved an exceedingly picturesque walk. The distant callings of a Lyre-bird were heard as we passed along the northern edge of the forest near the source of the western branch of Hardy's Creek. Reaching Clematis Gully about 4 o'clock, we decided to boil the billy and have afternoon tea. While the other members of the party were enjoying their first glimpses of the fern groves here, I took the opportunity of making a tour through the upper part of the gully, and was delighted by seeing some of the finest and largest growths of the Shady Spleenwort, *Asplenium umbrosum*, and the Mother Spleenwort, *A. bulbiferum*, I have ever come across. Other ferns were most luxuriant here, as well as mosses of several species, and, as the spot is so easily accessible to public roads, fern-lovers can see here with little trouble quite a number of our mountain ferns, but they must not be disturbed, being strictly preserved. It was while searching in this gully that I had the finest view I have ever obtained of a full-grown male Lyre-bird. It was only about three yards off when I noticed it. It seemed very tame, and was quite unconcerned about me so long as I did not move. I whistled, in the hope of its uttering some notes, but without success. After watching its scratching movements within an area of about a square yard for nearly ten minutes, I moved, when it at once disappeared down the gully among the ferns and undergrowth. Many other of our mountain shrubs and trees, in addition to Blackwoods and Sassafras, occur in this gully, such as the Long-leaved Lomatia, *Lomatia longifolia*, Austral Mulberry, *Hedycarya angustifolia*, Blanket-wood, *Bedfordia salicina*, and the Banyalla, *Pittosporum bicolor*, so that, with the climbers *Tecoma australis* and *Clematis aristata*,

the locality presents a delightful variety of vegetation to the eye of the tourist. The Banyalla is frequently found in this district making a host of the tree-fern trunks, on which it grows into rather large bushes. Most of the Dicksonia tree-ferns were unrolling from twenty to thirty new fronds above those of the previous season, while many of their trunks were covered with masses of the Spotted Polopody. A very fine mass of the Batswing fern was observed on the upper side of Clematis-avenue. A number of the plants were found densely crowded together, with erect parallel growths, many of the fronds being from three to five feet in height. Three of the party who were stopping overnight at Belgrave continued on to Sherbrooke Falls, and thence to the township. The rest returned to the Monbulk road, and enjoyed the sight of the picturesque vegetation along the western side of the road as they made their way stationwards.

The record of ferns for the day was twenty-one, and, as it is possible two or three of the smaller species were overlooked, the extent of the fern flora of the district may be set down at twenty-five, or about one-third of the Victorian list. This estimate would probably hold good also for the Dandenong Ranges as a whole.

I am indebted to Mr. Chas. Oke for the following notes about the entomology—or rather coleoptera—of the trip. He says :—" Insects were less numerous than is usual at Belgrave in early December ; but, as last summer bush-fires had swept over the greater part of the ground traversed, this was only to be expected. Careful scrutiny of every likely and unlikely spot revealed over eighty species of coleoptera, mostly common species, but a few rare ones were secured. The greatest rarities were three specimens of two species of Chlamydopsis, which were obtained only after very carefully examining numerous ants' nests. One specimen is an undescribed species, the others are the third and fourth specimens to be taken of *C. pygidialis*, Blackburn. I think I may safely say this is the first record of these interesting beetles being taken on a Club excursion. Other myrmecophilous beetles taken were a Colydiid, a Tenebrionid with remarkable antennæ, a Chrysomelid, and a Brenthid. As few flowering shrubs were met with, none of the flower-haunting species were collected."

The party returned to town by the evening train, well pleased with their outing.—F. Pitcher.

AT WARTOOK (GRAMPIANS).

By CHAS. DALEY, B.A., F.L.S.

(*Read before the Field Naturalists' Club of Victoria, 10th Nov.*, 1919.)

ON the pleasant, breezy morning of Thursday, 26th September, the Club members of the Grampians party, comprising Messrs. C. Gabriel and H. Hughes, Miss Nethercote, three lady friends, and the writer, keeping in view the supply of as varied and plentiful a collection of wild-flowers as could be obtained, and also being desirous of a change from the ordinary excursions arranged for tourists, set out from "Bellfield" with the object of visiting Wartook Reservoir, twelve miles distant. The route is down the main road to the pretty picnic ground at the foot of Mackay Peak, where the appropriately-named Stony Creek issues brawling from the rocky and picturesque gorge, Chautauqua Peak and Mount Difficult forming its northern and north-western slopes. Using the services of a pack-horse, the party was relieved of the necessity of carrying impedimenta such as rugs, coats, and provisions.

The track winds along the slope of Mount Difficult at a varying height and distance above the creek, musically splashing amid boulders and over cascades at the foot of the weathered western slope of the range. Along this track the vegetation is very luxuriant, many characteristic plants occurring, including the Snow Myrtle, *Lhotzkya genetylloides*, just bursting into bloom, the Grampians Fringe Myrtle, *Calythrix Sullivani*, *Thryptomene Mitchelliana*, the delightfully soft-blooming *Acacia longifolia*, var. *mucronata*, with the aggressive Spike Acacia, *A. oxycedrus*, *A. armata*, *A. diffusa*, *A. stricta*, and the fragrant *A. myrtifolia* in flower. Many other leguminous plants in flower or bud are noticeable—Daviesias, Dillwynias, Pultenæas, and Flat Peas, with the Golden Goodia and *Indigofera australis* in full bloom. *Tetratheca ciliata* shows on every side, whilst the Beard Heaths, the Twisted, *Leucopogon glacialis*, Snow, *L. virgatus*, and Ruddy, *L. rufus*, are exceptionally fine. *Bauera sessiliflora* occasionally displays a wealth of colour amid a tangle of scrub plants on each side of the track, the Epacrids being especially numerous. Orchids were scarce, the season being late. Even *Glossodia major* was absent. The Greenhoods, *Pterostylis longifolia*, *P. concinna*, *P. reflexa*, with *Diuris longifolia* and *D. maculata*, and a single specimen of *Caladenia Patersoni*, were obtained.

Crossing Epacris Creek about a hundred yards above the diverging track to Splitters' Falls (whose waters we can plainly hear far below), a narrow and steep bridle-track uphill turns almost abruptly at right angles to the road. This is the way to Wartook. Taking the ascent in easy stages over the loose

stones on the track, we pass through a veritable garden of flowers, in which *Epacris impressa* in all its shades, just past its best, the brilliant *Grevillea alpina*, the Purple Coral Pea, *Hardenbergia monophylla*, the Gorse Bitter Pea, *Daviesia ulicina*, several Rice-flowers, *Pimelea linifolia*, *P. flava*, *P. curviflora*, *P. axiflora*, just opening, the variable Hovea, the Dusty Miller, *Spyridium parvifolium*, dainty clumps of Eyebright, *Euphrasia collina*, the Golden Heath, *Styphelia adscendens*, freely shedding its flowers, the three Astrolomas, the Truncate Phebalium, with its white flowers, and Golden Hibbertias or Guinea-flowers, &c., made a varied display beneath Acacias, Leptospermums, and Eucalypts.

Passing over a moss-covered face of rock, we see on its surface a profusion of glittering Sundews or Droseras, amid which is an occasional Buttercup and many fairy-like Rock Pansies, *Utricularia dichotoma*. The ever-welcome Bushy Heath-Myrtle, *Thryptomene Mitchelliana*, the glory of the Grampians, is in fine flower. *Acacia Mitchellii* is bearing pods in place of flowers. The Pultenæas are mostly in bud. A few plants of *Conospermum Mitchellii*, attractive buds and large white flowers of Woolly Tea-tree, *Leptospermum myrsinoides*, the Prickly Grevillea, *G. aquifolium*, and the Horny Cone-bush, *Isopogon ceratophyllus*, lend variety amid the more showy plants. The Everlastings and Olearias were hardly as yet in bud.

Surmounting this spur, our course is easier to the north-west, and we descend gradually to a creek almost hidden in the tangle of ferns, tea-trees, and rushes, where we gladly lunch and rest after our fairly arduous climb. Resuming the track, which again ascends, we pass through patches of Spike Acacia, with *A. longifolia* and *A. myrtifolia* in less profusion. Occasionally, *Hakea rugosa*, *Banksia marginata* (dwarfed in size), the Cypress Pine, *Callitris cupressiformis*, and *Casuarina stricta* are seen, and also single specimens of the Geebung, *Persoonia rigida*, the Leafless Currant Bush, *Leptomeria aphylla*, in fruit, and the Scarlet Bottlebrush, *Callistemon coccineus*. The eucalypts are mainly Messmate, *E. obliqua*, Red Stringybark, *E. macrorrhyncha*, with occasionally a Narrow-leaved Peppermint, *E. amygdalina*, whilst the Grampians Gum, *E. alpina*, occurs on the ridges.

From our camping-place there was a fairly steep ascent. At the same place where it grew last year we found the Turquoise Berry, *Drymophila cyanocarpa*, rather a rare plant in the Grampians. Near it also, but not flowering, was the handsome climber, *Clematis aristata*. Another climber noticed was the Solid Apple Berry, *Billardiera scandens*, whilst the graceful blue Love Creeper, *Comesperma volubile*, enriched

some less showy plants with its twining bloom. Quite close to the track we flushed a Yellow Robin from its nest with two eggs. Passing on, we obtained a partial view of the Victoria Valley, to the south-west.

Before reaching the crest we passed through a thicket of somewhat stunted Hickory Wattle, *A. penninervis*, in appearance like the Golden Wattle, but stiffer, less verdant in leaf, and less prolific and graceful in flowers, which lack the rich golden appearance of *Acacia pycnantha*. *Correa speciosa*, both green and red in hue, was frequently seen. In a swampy patch the Pink Swamp Heath, *Sprengelia incarnata*, was conspicuous in relief amid a profusion of Beard Heaths, reeds, rushes, and spear-grass. The Nodding Blue Lily, *Stypandra glauca*, also adorned the more rocky places.

The character of the country alters beyond this ridge, for the massive, thick-bedded sandstones of which the Grampians mainly consists, now definitely ascribed by Mr. F. Chapman, A.L.S., on palæontological evidence to the Lower Carboniferous series, have a westerly dip at rather low angles, thus giving an easy gradient in that direction, whilst eastwards the beds culminate in the bold, vertical, and lofty cliff-faces abruptly marking the disintegrating summits of the parallel ranges. Thus, from the Mount Difficult Range—in strong contrast to the rugged eastern slopes—the surface westward is seldom much broken by outstanding rock-masses unless in some bold gorge carved out by water action, such as that of the Mackenzie River, where a very rapid and precipitous descent occurs in the river bed. After crossing the Divide a very gradual slope, intersected by runnels of clear water beset with rushes and tea-trees, with vigorous specimens of the Flat Cord Rush, *Restio complanatus*, is met with, the water providing welcome and periodic refreshment to thirsty travellers, as well as to our pack-horse, whose regulation pace of two miles per hour we had sometimes to accelerate. Sprengelia grew freely, and fine specimens of the Leafless Bitter Pea, *Daviesia brevifolia*, with unusually deep red flowers. The Brown Spurge, *Amperea spartioides*, was growing well, also the Bulbous Fringe Lily, *Thysanotus tuberosus*. At one point a patch of considerable extent was visible, covered solely with the Grass-tree, *Xanthorrhœa australis*. It was noticed that *Acacia verticillata* and *A. juniperina* have here a tendency to assume a dwarfish habit, a circumstance previously mentioned by Mr. J. W. Audas in a paper read to the Club. Occasionally a splash of bright red colouring on some of the younger eucalypts was, on examination, found to be caused by fasciation, and on Acacias by the prevalence of bunches of imitative galls.

A first view of the lake is obtained from a distance of about

three miles. Last year, diverging from the track, we obtained from an isolated craggy hill an excellent view, reminding us, with the outspread water and mountainous surroundings, of Scott's lines on Loch Lomond, which

> "In all her length far winding lay,
> With promontory, creek, and bay."

The last mile or so had been swept by fire last year, and was rather sombre-looking. Approaching the lake, the Spreading Grevillea, *G. repens*, grew luxuriantly along the ground, whilst moisture-loving plants, such as the Grass Daisy, *Brachycome graminea*, the two Yellow Stars, Hypoxis, the *Stackhousia linarifolia*, with creamy flower-spikes, the Murrnyong Yam, *Microseris Forsteri*, Milkmaids, *Burchardia umbellata*, in bud, and *Craspedia Richei*, were numerous. Amid the ordinary Early Nancy flowers, *Anguillaria dioica*, occurred quite a patch which had purplish petals—an unusual circumstance, concerning which inquiry was made at our September Club meeting.

On arrival at the reservoir we went along the retaining bank, which is about a mile in length, and near the other end (by the courtesy of Mrs. Kimberley) we camped at the caretaker's house, where we had arranged to stay for the night. After tea the pony was turned into a paddock, and we repaired to the swampy ground below the reservoir in quest of the lovely sprays of Sprengelia which grow in great profusion in so suitable a habitat. One plant was found with pure white flowers. We were also fortunate enough to obtain some specimens from a few scattered plants of the Woolly Heath, *Epacris lanuginosa*, another moisture-loving plant, whose white flowers I had only once before seen in the Grampians. We also found a few fine sprays of the Mealy Honey-Myrtle, *Melaleuca squamea*, with its pink flowers. One of the most striking features of this swamp vegetation is the prolific growth of the attractive Tassel Cord-rush, *Restio tetraphyllus*, a highly decorative plant with fine glossy-green foliage, growing from four to eight feet in height. Another interesting plant which Mrs. Kimberley brought under our notice was a variety of *Daviesia corymbosa*, the Narrow-leaved Bitter Pea, the leaves of which are somewhat similar in appearance to those of a phyllodinous Acacia, and make the term "narrow-leaved" appear a misnomer. The variety is *Daviesia corymbosa* (*mimosoides*). It grows to a height of three to five feet. The tonic bitter principle is very evident in the leaves of this variety.

We splashed about the swamp until darkness and a threatening storm compelled us reluctantly to withdraw, each laden with huge bunches or armfuls of the handsome Swamp Heath, which ultimately was so much admired and in such great demand at the recent wild-flower exhibition.

We were early afoot next morning, and in the bush below the house found the Blue Tinsel Lily, *Calectasia cyanea*, and the Fringed Heath-Myrtle, *Micromyrtus microphylla*, as well as some fine Hovea showing marked heterophylly in its leaves. The flowers of the Purple Violet, *Viola betonicifolia*, were unusually deep in hue.

After breakfast we started through the bush for the falls, about three miles distant, on the Mackenzie River, which has cut for its current a deep and precipitous gorge, into which the volume of water falls about 90 feet, forming a beautiful sight—the finest of its kind in the Grampians. Just below the falls we were much gratified to find in full bloom several handsome shrubs of *Hovea longifolia*, forming, with its abundant lilac-coloured flowers and dark green foliage, a charming picture. These shrubs were two or three inches in diameter at the base and from seven to ten feet in height. Unfortunately, the bloom was too far advanced to remain on the specimens gathered. Masses of Umbrella and Coral Ferns, *Gleichenia flabellata* and *G. circinata*, in the gorge were very fine. Returning, we viewed an interesting and extensive series of sparkling falls or cascades called the Scattered Falls, which are also very beautiful, and well worthy of a visit. The valley of the Mackenzie should be fruitful in result for botanical research. We returned to the reservoir in time to pack up and have lunch.

Wartook Reservoir is a fine sheet of water, 3 miles 50 chains long and 1 mile 20 chains wide. The maximum depth is 29 feet. The containing bank, about a mile in length, conserves the drainage from the lofty watershed of the Mackenzie River and tributaries. The situation has been well chosen, the approximate area of the lake being 2,556 acres, impounding 6,560 millions of gallons of water, or 160 millions of gallons more than the Yan Yean Reservoir, whose area is 1,360 acres. The comparison serves to give an idea of the extent as well as the potential value of the conservation. Below the high bank the surplus water, or regulated flow, as well as the drainage outside of the reservoir area, merges into the Mackenzie River, which, besides having the most imposing falls in the Grampians, has fine pools where English perch and trout may be caught. About ten miles distant the water is diverted into channels, which carry the precious fluid northwards, and, in conjunction with the Lake Lonsdale scheme on the eastern side of the Grampians, supply the dry plains as far north as the towns of Rainbow and Warracknabeal. This should be of increasing benefit and utility to the dwellers in the arid areas. A project has been mooted to utilize the water-power at Wartook for lighting the towns of Horsham and Stawell, as well as Hall's Gap, with electricity. A pleasing feature at

early morning and sunset is the varying effect of the lights and shadows on the lake, which enhances the charm and beauty of the scene. Wartook is easily reached by road from Horsham, about 24 miles distant.

About 1 p.m. we loaded up our pony with packs much increased in size by our floral gatherings, and, bidding good-bye to Mrs. Kimberley, with many thanks for her kindness and assistance in procuring flowers, we started the return journey. The weather was all that could be desired, and the trip interesting and enjoyable. Wartook can be confidently recommended for a F.N.C. camp.

On a previous visit we had startled a flock of seven Emus, but, excepting birds, which, contrary to general opinion, are numerous, the fauna was not conspicuous, although kangaroos, wallabies, and deer frequent the watershed of the lake. Among some of the birds seen or heard were the White Cockatoo, Black Cockatoo, Harmonious Shrike-Thrush, Bell-bird, Flame-breasted and Yellow-breasted Robins, Welcome Swallow, Yellow-rumped Tit, Magpie, Kookaburra, Bronzewing Pigeon, Strepera, Blue Wren, Grey-crowned Babbler, Red-tipped Diamond-bird, several species of Parrots, Pallid Cuckoo, Mopoke, and the White-breasted Thickhead. Above the lake a magnificent specimen of the Eaglehawks, poising high

"Overhead,
"Motionless as though suspended by a viewless thread."

attracted our attention. The resemblance to a far-distant aeroplane was very real. Aquatic birds were conspicuous by their absence.

On the homeward journey a second Yellow-breasted Robin's nest, with eggs, was found. Our return from Wartook was uneventful, and we arrived at "Bellfield" in time and in excellent trim for tea.

Next day we departed homewards with the Bureau party, leaving behind Miss Nethercote and Mr. C. Gabriel, without whose effective services in finally rounding up and enlisting the residents of Hall's Gap for active assistance in gathering flowers at the week-end for transmission on the Monday, the Grampians display would not keep pride of place at the show.

With twenty years' experience of the Grampians and its delightful flora, I may be permitted to say a word of warning as to the probability of a steady and accelerated depletion in its wild-flowers as a result of the growing popularity of the place and the wholesale gathering, not only of the flowers, but also of the young plants. This is specially observable during the last two years, places formerly noted for flowers becoming deprived of their floral treasures, and some plants once easily obtainable in these places becoming scarce or no longer procurable. The more pleasing the bloom the greater

the demand for it—*e.g.*, Thryptomene, Grevilleas, Lhotzkya, Sprengelia, and Boronias. Recently in the "Nature Notes" of the *Argus* it was mentioned that on a children's excursion from northwards to the Grampians 400 packets of Thryptomene had been sent away. It is not uncommon in spring to see bunch after bunch of the fragrant Hairy Boronia, *B. pilosa*, in which every spray has been pulled up by the root, not perhaps intentionally, but, as the species only grows in moist, loose soil, the plant is readily detachable on being plucked. Large quantities of flowers are daily picked, to be as idly cast aside.

It would be a great pity if, as is not improbable, some of the distinctive plants of this great garden of Nature's floral bounty should in course of time, through the thoughtlessness of those to whose pleasure they minister, become extinct or unattainable in the accessible areas of the district.

[The paper was illustrated by a large series of dried specimens, photographs, &c.—ED. *Vict. Nat.*]

"AUSTRAL AVIAN RECORD."—The December number of this journal (vol. iii., No. 7) is devoted to biographical notes, with portraits, of three well-known Australian ornithologists, viz., Samuel Albert White (S.A.), Thomas Carter (W.A.), and William David Kerr Macgillivray (Vict. and N.S.W.) The first-named, Captain White, has been an ardent worker in Australian ornithology, principally in the drier parts of the continent, and his writings in *The Emu* and other publications have always been of the greatest interest. Mr. Thomas Carter, who for a time was a member of the F.N.C., has been associated with the bird life of the country round North-West Cape, W.A., another dry part of the continent. He contributed one paper to the *Victorian Naturalist*, but most of his work has appeared in the *Yorkshire Naturalist* (his native county) and *The Emu*. The third of the trio, Dr. W. Macgillivray, of Broken Hill, is known to many members of the F.N.C., and was present at a recent meeting on his return from the Great War. Like the others, he came of a family known as lovers of natural history. He first displayed his bent in the "Gulf country" of Queensland. During his school days in Melbourne he did a considerable amount of collecting, and in June, 1887, became a member of the F.N.C., to which he has remained faithful ever since. He has been a resident of Broken Hill for the last twenty years, and has done good work in that district. In 1913, accompanied by Mr. J. A. Kershaw, F.E.S., he made an extended visit to North Queensland, the results of which were published in the *Naturalist* by Mr. Kershaw (vol. xxi., December, 1914). He has contributed articles both to the *Naturalist* and *The Emu*, but owing to his busy life has not been able to put many of his accumulated notes into print.

Abnormal Tadpoles.—The tadpoles exhibited to-night were hatched from spawn brought from Cheltenham early in September, 1918, for the purpose of providing food for Japanese and English newts. A number of tadpoles always get missed by the newts, and these soon grow to a size that makes them immune from attack. Larvæ thus missed often remain as tadpoles through the winter months. This retarded metamorphosis is in itself remarkable, especially as the majority of these over-wintered larvæ grow to a larger size than those living under purely natural conditions. It can easily be seen on inspection that these two-season larvæ differ considerably in appearance from the normal specimen exhibited. There is an interesting specimen in the jar having a large external respiratory siphon that reminds one of the mollusca, and, in addition, has a hooked process growing midway on its tail. Others, again, are very small in the head and body but have extremely long tails. The conditions under which these tadpoles live appear to be excellent, the water being sweet and clear, as it must be, otherwise the newts would not keep in such perfect condition and breed so freely. The food supply for tadpoles is also abundant, as boxes and pots of *Vallisneria spiralis* and other aquatics are used for oxygenating the water. From the appearance of the bodies of some of these larvæ, one is inclined to think that the contraction of the abdomen may be due to the shortening of the intestinal canal owing to the external metamorphosis being long overdue, while the internal change is going on to fit them for a carnivorous diet in place of their present herbivorous one. Possibly some member of the Club may be able to throw some light on these phenomena of retarded metamorphosis, which, although a puzzle to me, has been going on for years with tadpoles used in connection with the feeding of newts. The larval condition of these tadpoles will persist until late in autumn, and occasionally two or three will remain in the larval condition over the second winter.—H. W. Davey, F.E.S.

[This note in explanation of Mr. Davey's exhibit at the October meeting of the Club (*Vict. Nat.*, xxxvi., Nov., 1919, p. 99) has unfortunately been overlooked.—Ed. *Vict. Nat.*]

"Sydney Mail" Nature Notes.—In its enlarged form the *Sydney Mail* devotes two pages weekly to "Outdoor Australia"—a series of notes and queries by various writers, in which many remarkable happenings are chronicled, some, of course, with a tinge of doubt attached to them. The pages are well illustrated, and should give an impetus to nature observation in the mother State.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 9th February, 1920. The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about fifty members and visitors were present.

CORRESPONDENCE.

From Mr. Allan MacCaskill, jun., Coleraine, forwarding for the Club's library a copy of Webster's "British Orchids." It was decided, on the motion of Mr. St. John, seconded by Mr. Keep, that a letter of thanks be forwarded to Mr. MacCaskill.

REPORTS.

A report of the excursion to the "Organ Pipes," Sydenham, on Saturday, 17th January, was given by the leader, Mr. A. L. Scott, who said that there had been a good attendance of members. The day was very pleasant, and the party journeyed by char-a-banc *via* Bulla and Holden. At his request, Mr. R. E. Luher, B.A., who had made a special study of the district recently, kindly consented to act as "demonstrator," and at different points gave an outline of the geological history of the surroundings, special attention being drawn to the lava flows and the resulting physiography, and to the kaolin occurrence near Bulla. Photographs were taken by several members of the many interesting features met with.

[Accounts of previous excursions, with illustrations, will be found in the *Naturalist* for November, 1900, vol. xvii., p. 120, and July, 1911, vol. xxviii., p. 51.—Ed. *Vict. Nat.*]

Mr. Barnard suggested that the district should be visited in spring, when the appearance of the hills and valleys would be so totally different to the middle of summer that few would recognize it as the same place.

The president reported that, owing to unforeseen circumstances, the excursion to Powelltown had not been carried out.

A report of the excursion to Beaumaris on Saturday, 31st January, was, in the absence of the leader, Mr. J. Shephard, given by Mr. J. Stickland, who said that, though the tide was favourable, owing to an unfortunate change of wind just before the party reached the scene of operations, the use of the tow-net could not be attempted, and the members had to content themselves with what they could collect along the shore. The results reported revealed nothing but ordinary occurrences, but a gathering of foraminifera has yet to be worked out.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Alfred J. Tadgell, 430 Bourke-street, Melbourne, was elected as an ordinary member of the Club.

GENERAL BUSINESS.

Mr. F. Chapman, A.L.S., drew attention to a clerical error in a report in the last *Naturalist*. The editor remarked that it was sometimes difficult to read authors' manuscript, especially where scientific names were concerned.

Mr. F. Keep referred to the very interesting paper that had been read by Dr. C. S. Sutton at the last two meetings of the Club on "Wild Life in Tasmania," contributed by Messrs. Weindorfer and Francis, and moved that a letter of thanks be sent to the authors. The motion was seconded by Mr. D. Best, and carried.

Referring to the monthly meetings, Mr. H. B. Williamson suggested that some endeavour should be made to make the Club's meetings more attractive, suggesting that the lantern be used more frequently. Messrs. Chapman, Barrett, and Searle supported these remarks, adding that similar action in other societies had led to better attendance and an increase in membership. Mr. C. C. Plante urged that something be done to make the meetings more popular and more valuable to the ordinary unscientific member, especially on two or three nights of each year. He added that the fact that the hall was some way out of the city was more or less of a detriment to good attendance. Miss C. C. Currie, as a country member, supported these remarks, urging that more help might be given to country members, especially in the naming of specimens. The secretary supported the remarks of Mr. Plante, urging especially that some scheme be arranged whereby regular popular evenings be established.

Several members having spoken, it was resolved, on the motion of Mr. J. L. Robertson, M.A., seconded by Mr. C. Barrett, that the Club advertise its meetings in the daily papers. It was suggested during the discussion that a publicity campaign be entered upon ; and in this respect Mr. C. Barrett offered to interview the editors of the Melbourne papers.

PAPERS.

The committee having decided that the evening should be devoted to "Notes on Holiday Rambles," several members spoke or read short papers on their recent holiday experiences.

Dr. C. S. Sutton reported a visit to Mud Island, near Port Phillip Heads, describing the locality as being really three small islands separated by fordable passages. He described the bird-life, and also listed fourteen species of plants growing on the island.

Mr. F. Pitcher detailed a visit to Loch Valley, referring principally to the fern life of the district, and to the destruction of the tree-fern flora owing to the removal of the timber trees. He stated that Mrs. Prescott, of Loch Valley, *via* Neerim North, was prepared to receive a limited number of visitors who wished to explore the district.

Some notes were read from Miss G. Nethercote, who had visited East Gippsland and Mallacoota.

Mr. F. G. A. Barnard mentioned that during a one-day trip to Britannia Creek, commencing about 2½ miles from Yarra Junction, he had seen wonderfully fine fern scenery, and also much fine timber. Seedling ferns of many kinds abounded in the tramway cuttings, and he had noticed a seedling of the Leather Fern, *Aspidium coriaceum*, as being somewhat unusual in such a position. Seedling beeches were also plentiful.

Mr. C. Daley, B.A., reported on a tour from Alexandra through Taggerty and Marysville to Healesville. Bird-life was stated to be abundant, and grasshoppers very prevalent. Six Wedge-tailed Eagles were seen, and the boundary-line of locality between the Black-backed and the White-backed Magpies was noted.

Mr. F. Chapman, A.L.S., gave an account of a recent holiday in the Dromana district, which he said should prove interesting to the Easter excursion party.

Mr. H. B. Williamson gave an account of his visit to Mallacoota, recording the more uncommon flora. He also exhibited samples of grass-tree resin from *Xanthorrhœa hastilis*, and fruits from a banana grown in the garden at Doran's Hotel. The "singing sands" of Mallacoota were described and discussed, specimens being exhibited.

Mr. F. Chapman said that the phenomenon of these "singing," "shrieking," or "musical" sands had been studied in England and reported in the *Geological Magazine* in 1902 (see also *Victorian Naturalist* for February, 1903, vol. xix., p. 135). Mr. F. G. A. Barnard said that Dr. T. S. Hall had read a short paper on the question before the Club some years ago, recording his experiences at Phillip Island (see *Victorian Naturalist* for June, 1892, vol. ix., p. 39).

NATURAL HISTORY NOTE.

Mr. F. G. A. Barnard said on the previous day he had visited Malleson's Glen (the head of the Don River), between Healesville and Launching Place, and had been surprised to find that *Selaginella stolonifera*, the ordinary Selaginella of our greenhouses, a native of the West Indies, had established itself there in such quantities that it might fairly be considered an introduced plant. It had probably originated by wind-borne spores from the well-known garden of Mr. A. Agnew, not far away.

EXHIBITS.

By Mr. F. G. A. Barnard. — Specimens of *Selaginella stolonifera*, from Malleson's Glen, Don River.

By Mr. D. Best.—Three undescribed longicorn beetles from Australian Alps.

By Mr. F. Chapman, A.L.S.—Photographs of Dromana and Rosebud, *apropos* of the proposed excursion to the district at Easter.

By Miss Currie.—Flowering specimens of the orchids *Cryptostylis longifolia* and *Orthoceras strictum*; galls on eucalyptus leaves; and flowering spikes of bulrush, *Typha angustifolia*.

By Mr. H. F. Clinton.—Photograph of chain lightning, taken at Melbourne on 26th January last.

By Mrs. C. H. Edmondson.—Specimen of a Lobelia, picked in Western Australia on 5th January last, the flowers of which have continued to open though it has received no nourishment of any kind since that date.

By Miss A. Fuller.—Specimen of Trichinium (Philotis), sp., N. O. Amarantacea, from Western Australia.

By Mr. C. Lambert.—Photographs of "Organ Pipes;" Kaolin Quarry, Bulla; and Maribyrnong River, near Bulla, taken during Sydenham excursion.

By Mr. A. L. Scott.—Photographs of "Organ Pipes," Sydenham, taken some years ago; also of basalt columns on Merri Creek, near Pentridge Stockade.

By Dr. C. S. Sutton.—Photographs of rookery of White-faced Storm-Petrel, also of Little Tern, with nest and eggs; photographs of vegetation, *Calocephalus Brownii* and *Scirpus nodosus*, all taken at Mud Island, Port Phillip.

By Mr. L. Thorn.—Flowering head and leaves of a garden Sunflower, standing 10 feet 6 inches high, the head of flowers being 13 inches across and the leaves 20 inches across.

By Mr. H. B. Williamson.—Specimens of *Goodenia stelligera*, from Cann River; *Loranthus miraculosus* on *Angophora intermedia*, and orchid, *Dendrobium speciosum*, from Genoa River; *Persoonia lanceolata*, *P. arborea*, resin from *Xanthorrhœa hastilis*, Spear Grass-tree, also flowers and fruit of banana, grown at Mallacoota—all from Mallacoota.

After the usual conversazione the meeting terminated.

CORRECTIONS.—In February *Naturalist*, in notice of Mr. Chapman's exhibit on page 135, delete words "long mistaken for an insect." On page 42, in line 21, for "*myrsinoides*" read "*lanigerum*"

EXCURSION TO LOCH VALLEY.

Encouraged by the reports of members of the Club who had spent last Easter at Loch Valley, the committee selected it for the Christmas excursion of the present list. The locality is somewhat off the beaten track, and requires a little explanation. This, however, can be given as I proceed. Owing to the difficulty of securing accommodation, the party was limited to eight, seven finally joining in the trip. Melbourne was left by the first train to Warragul on 24th December. The morning had every appearance of being hot and uncomfortable, but by the time Warragul (61 miles) was reached a decided change had taken place, and rain clouds were gradually coming up. Changing trains here for the Neerim line, new country for the majority of the party was entered on. Some rather picturesque scenes—the Shrubby Helichrysum making a fine show—were passed on the way to Neerim South, where about an hour was occupied in re-making the train, &c. On leaving Neerim South the train winds up the valley of Red Hill Creek, amidst the remains of a blackwood forest, passing a stone-crushing plant which is at work on the Older Basalt, converting it into ballast. More extensive views are obtainable as it approaches Neerim, when the Tarago valley and the Labertouche Hills—the part visited from Longwarry for *Boronia pinnata* some twelve months ago—come into view on the left. Nayook, the next station, is the highest on the line (1,412 feet), and we get a glimpse of the situation of Nayook Glen, a visit to which is on our programme for the trip. On leaving Nayook the line, hitherto running northerly, turns easterly and descends into the valley of the Latrobe, dropping 700 feet in the six miles to Noojee, the terminus, and our destination. This six miles is one of the finest bits of railway scenery in Victoria. There is hardly a straight hundred yards; at least half a dozen huge timber viaducts occur, one of which is 95 feet high and 300 feet long. Several deep cuttings in contorted Silurian are passed through, while fern and gum scenes abound, and in the distance the Yarra divide stands up against the northern sky. About a quarter of a mile from the station the Latrobe was crossed, rushing from the Warburton Hills to end its career near Sale in Lake Wellington. It had been raining ever since we left Neerim South, and the road to our boarding-house was rather soft; however, a twenty-minutes' walk put us under shelter. The house had a delightful outlook, a tree-fern-covered hill standing up across the river, and in the varying lights and shades affording many pretty pictures. Here, at Easter, we had heard Lyre-birds, but this time the scrub was generally too wet to get near their haunts. More rain fell during the night, and, though Christmas morning broke fairly fine, everything was so wet that we were

late in making a start. It was decided that the highest country would probably be the driest and cleanest, so we made our way up the hill at the back of the house towards the Ridge road—a road that keeps along the summit of the range separating the Loch from the Tooronga valley. The hillside in spring would doubtless be gay with Tetratheca, Epacris, and other flowers; now the most prominent flower was the creamy Holly-leaved Lomatia, *Lomatia ilicifolia*, with here and there the deep blue of *Lobelia simplicaulis*. The Cork-screw Fern, *Lindsaya linearis*, was growing well in many places. Getting on to the road, we came across a shrubby plant, apparently an Eriostemon. The road, as we expected, was fairly dry, and bordered with vegetation of all kinds. The grade was not excessive, so we wandered on, forgetting that we had not brought lunch with us. At last the time came that we must either turn back or go without lunch. Four decided that the way was too interesting to turn back, and continued on for another three miles till the valley of Camp Creek, leading to the Tooronga, came in sight. Beeches, Sassafras, and *Acacia penninervis* occurred in quantity. We had had many glimpses of homesteads in the Tooronga valley, several hundred feet below us, and could hear the distant roar of the waters of the falls on the other side of the valley. Just here the timber greatly improved, but to get to the really fine timber we should have gone three or four miles further, to where paling-splitting is going on. We left that for the next visit. Returning for about three miles, we met a settler, who offered to show us a bridle-track over the ridge down into the Loch valley, and, as this would be new country and save us several miles, we gladly accepted his offer, after partaking of a cup of tea at his bush home. Many attractive pictures of trees, ferns, &c., met our eyes as we made our way down the steep hillside, and by six o'clock we were once more under the hospitable roof of "Braeside." For Boxing Day arrangements had been made for a vehicle and pair to take provisions and bedding up to the top of the Yarra divide, so that we could devote two days to the main object of the excursion—the visit to the magnificent trees on Mount Horsfall. After about five miles up the Loch valley the road takes to a spur and winds round the basin of Skerry's Creek, affording fine views across the Neerim country to the Strezleckies in the distance. The usual vegetation bordered the road, while below were many beautiful fern gullies. At about 2,000 feet some fine timber was passed, and we reached an undulating table-land. Here a Flame-breasted Robin was good enough to allow us to examine him through the field-glass. A solitary *Papilio macleayanus* flitted from flower to flower of the golden-hued Senecios. Soon we crossed the head of Skerry's Creek, and were welcomed at the homestead of the Messrs. Litaze, the

only settlers remaining at this high altitude (about 2,500 feet). Lunch was spread under a fine apple-tree, and keen appetites soon made havoc amongst the good things. About 1.30 p.m. Mr. Camille Litaze undertook to act as our guide to Mount Horsfall, some four miles easterly along the divide. Fifty years before, Whitelaw's track had been cut from Berwick to Wood's Point, along the summit of the range, and we were still able to discern the blazes, but scrub, principally Helichrysum, and fallen timber made it difficult to follow, and after getting within about a mile of the top of Mount Horsfall we had to abandon the attempt, but we had been rewarded, for we had seen and passed through some of the finest milling timber in Victoria, the trees, *Eucalyptus regnans*, known as Mountain Ash, standing almost as close as they could stand, and running up 150 feet or more without a branch. Near one of the heads of Alderman's Creek (flowing to the Yarra) were found a number of plants of an orchid, Chiloglottis, but they were past the flowering stage. Fine bushes of the Balm Mint-bush, *Prostanthera mellissifolia*, were occasionally seen, but few of the delicate lavender flowers remained. From a height of about 3,500 feet on Mount Horsfall there was a fine view of the Yarra valley and its enclosing hills, while far away, slightly to the east of north, was a very prominent mountain, which I took to be Mount Buller, near Mansfield. We scrambled back the way we had come, and reached Litaze's again about 7.30 p.m. By 9 p.m. we had despatched tea under the apple-tree, and then prepared to make ourselves comfortable for the night, which, thanks to the hospitality of the Messrs. Litaze, was easily accomplished. Next morning was dull and windy, and, though Mr. Litaze said it would not rain till the afternoon, one member was persistent in the opinion that it would rain before 11 a.m. Mr. Charles Litaze offered to guide us down through Petschak's abandoned selection on to the Loch valley road, and we gladly accepted his offer, for it took us round the other side of the Skerry's Creek basin. By 10.30 a.m. rain was falling, and our prophetess was right. Many delightful scenes had to be hurriedly passed as we descended the range, but at Skerry's Creek we decided to stop a while for lunch, and under the shelter of a fine beech hardly noticed the rain. The ground was strewn with the fallen beech leaves, which made the track, at a distance, resemble a gravelled path. We were still about eight miles from home, and, as the rain was gradually increasing, we had to hurry along, and had little time to admire the magnificent vegetation along the road, which, from its beauty, is known as Callaghan's Avenue—after a settler who hewed a home out of the forest alongside the road. The track crossed the Loch two or three times, and finally joined the main road at the foot of the hill we had turned up the previous morning,

making a round trip of about twelve miles of as fine scenery as one could wish to see. We reached "Braeside" about 4 p.m. like the proverbial drowned rats; however, as each had a change of clothing available, no one seemed to suffer, and, though uncomfortable, the rain was perhaps better than the blazing hot day which one might expect at that time of year. It took all our attention to get boots and clothes dry for use on Sunday, which was again showery; however, three ventured out in the afternoon and visited the Latrobe valley, getting about three miles up-stream from the bridge. A timber tram is now being constructed from Noojee, which will reach within about eight miles of Powelltown, so that when completed Noojee can be reached *via* Yarra Junction in about seventy miles as against ninety miles *via* Warragul. Led by an adventurous spirit, we tried to keep close to the Latrobe on our return, but the ground was too swampy, and we had to keep to the tram. Fine King Ferns and the Strap Fern, *Lomaria Patersoni*, grew in this part, and some nice seedlings were secured. Our visit to Loch Valley was nearly over, and by half-past eight on Monday morning we had started on the return journey. The train did not leave till 3 p.m., but, by starting early, we were able to walk along the line over the great viaducts as far as Nayook, and then across to the Glen, about a mile distant, spend a couple of hours there, and catch the train at Nayook at 4 p.m. The Glen is almost unique. From our flying visit it seems to be about half a mile long and a couple of hundred yards wide, little larger than the Sherbrooke Falls glen, but deeper. It is crammed full of tree-ferns, beeches, sassafras, Hedycarya, &c., and is a truly lovely spot, My fear is that, as the surrounding hillsides become cleared. the hot winds will get into it, and the vegetation will gradually lose its vitality. Two plants attracted our attention here—the rare climber, *Fieldia australis*, N.O. Gesneraceæ (the order to which the garden Gloxinia belongs)—unfortunately, it was out of bloom, but we found a large white fruit; and the fern *Davallia pyxidata*. The latter was quite new to me. The Glen is a public reserve, and paths have been made through it, while a shelter pavilion, look-out, and fire-places have been provided. Of course, no one is allowed to touch the vegetation, but it is a great pity the reserve does not contain fifty acres instead of only five. The home journey was made under good conditions, and we separated, trusting that ere long Loch Valley would see us again. One of the party, who devoted himself to trout fishing when the weather permitted, reported favourably on the Loch as a trout stream.—F. G. A. Barnard.

WILD LIFE IN TASMANIA.

By G. Weindorfer and G. Francis.

(Communicated by Dr. C. S. Sutton.)

(*Read before the Field Naturalists' Club of Victoria, 8th Dec,* 1919.)

The following notes on Tasmanian wild life are the result of observations made by us during periods of nine and fifty years respectively in Middlesex Plains and Cradle Mountain districts. The locality is a remote and picturesque one, and very diversified. Within it are wide, grassy plains or sub-alpine meadows, high wind-swept plateaus verging on an elevation of 4,000 feet, deep river gorges, secluded lakes and pools, cascades and waterfalls, and gloomy forests, into some of the recesses of which no one has ever yet penetrated. In all of these situations, at all times of the day and night, in all weathers and in every season of the year, our information has been picked up, mostly in an accidental way, and in the night time largely by the aid of an acetylene lamp fixed above the rim of the hat by a metal spring band.

We do not pretend that our records are exhaustive, and, indeed, have refrained as far as possible from setting down such facts as are well known or can be observed in the animals when kept in captivity, but nevertheless hope that they may be of interest to members of the Club. The subjects to be dealt with are as follow :—

Phascolomys ursinus, var. *tasmaniensis.*
Macropus ruficollis, var. *bennetti.*
Macropus billardieri.
Pseudochirus cooki.
Trichosurus vulpecula, var. *fuliginosus.*
Dasyurus maculatus.
Dasyurus viverrimus.
Strepera fuliginosa.

Locality and Climate.

The Middlesex Plains and Cradle Mountain districts are situated between 30 and 40 miles due south of the port of Burnie, on the north-west coast. The territory includes the head waters of the Wilmot, Dove, Macintosh, and Fury Rivers and their tributaries, and is, at Middlesex, situated about 2,600 feet above sea-level, rising towards the south-west, where it culminates in the Cradle Mount with 5,069 feet. Interspersed with grassy plains, deep river-gullies, and high plateaus, it is, in its lower parts, covered with extensive eucalyptus and beech forests, which ascend to an altitude of about 4,000 feet. With the exception of the Van Diemen's Land Company's cattle station and one or two minor runs, it is practically un-

occupied Crown land, the writers of this paper being the only permanent inhabitants.

The climatic conditions vary according to altitude, and from a meteorological point of view the locality falls within the area of Tasmania's West Coast. The rainfall is copious, the record for 1918 at Middlesex being 71.26 inches during 202 days, that for Cradle Valley (3,000 feet above sea-level) totalling 98.14 inches in 219 wet days, the bulk of the precipitation in both cases having been in the winter and spring months. Thermometer readings only began at Cradle Valley on 1st January, 1919, and the monthly results of the first year's observations are as under :—

Month.	Dry Mean.	Wet Mean.	Abs. Maxim.	Abs. Minim.	Mean Max.	Mean Minim.	Grand Mean.	Humidity.	Rainfall.
January	45.40	43.30	77.00	29.00	57.58	39.74	48.66	85.00	570
February	52.62	51.23	77.00	40.00	64.90	47.20	56.00	90.57	254
March ..	44.48	43.75	68.00	30.00	53.70	40.70	43.97	94.00	733
April ..	44.03	43.08	63.00	30.00	54.93	39.33	47.13	92.00	535
May ..	41.58	40.00	60.00	26.00	48.38	34.84	41.61	87.00	830
June ..	36.66	36.23	49.00	23.00	43.16	33.16	38.16	96.00	1870
July ..	35.53	34.87	49.00	21.00	42.03	29.16	35.59	94.00	1081
August..	37.06	36.33	58.00	18.00	44.54	29.64	37.09	94.00	815
Sept. ..	40.70	39.36	60.00	22.00	49.30	32.56	40.93	89.00	1203
October	46.59	43.19	80.00	26.00	57.45	36.38	46.91	76.00	835
Nov. ..	53.95	48.15	79.00	27.00	65.33	37.50	51.41	65.00	420
Dec. ..	54.48	50.79	79.00	29.00	65.58	40.29	52.93	77.00	465
Year ..	44.42	42.52	80.00	18.00	53.90	36.71	45.31	86.00	9611

Readings taken at 9 a.m.

Snowfalls during the winter months are of frequent occurrence, and vary from a few inches to four feet (in July, 1919). However, the landscape is rarely covered with it for longer than a few days, subsequent warm rains generally disposing of the greater part of it in relatively short time. Light falls of snow may occur at any time during the year—six inches even towards the end of last January.

PHASCOLOMYS URSINUS, VAR. TASMANIENSIS, LORD.

The Tasmanian wombat, commonly but erroneously called "Badger," is the most stupid of all the animals of the bush. Before the advent of man and his dogs the full-grown animal probably did not possess any enemies, with the possible exception of the marsupial wolf, which, however, does not now, and very likely never did, frequent the comparatively open bush land of these higher elevations. Under the circum-

stances, the wombat's existence must indeed have been a happy one, for, apart from the very light cares of its young, it could have had no worries, and Nature had bountifully provided it with every requirement. Never having had to exercise its wits to make a living, it has come about that its body has developed rather at the expense of its brains. In years gone by it was the prominent feature of the landscape, grazing and gambolling in broad daylight on the open grassy plains, and taking little notice of the occasional human. With the growth of settlement, however, it has become more wary, and its numbers have much diminished. Though still in comparatively large numbers in areas where the kangaroo trapper is unknown, its constant destruction in game country must lead to further lessening of its numbers.

The wombat's skin is at present commercially valueless; but, seeing that it makes a very admirable mat, it seems strange enough that no market for it yet exists. Thousands of these animals are destroyed every year by the trapper of kangaroo and wallaby—not in wantonness, but because of their interference with his snares. A snarer once declared that the best protector of the kangaroo is the wombat, because a wire snare set only about six inches above the ground will frequently be walked into by this animal, with the result that in the endeavour to free itself the snare is rendered useless. For this reason the luckless animal, if caught, is knocked on the head, and where it is numerous the snares are set at least one foot high. These, in most cases, the wombat clears, for in walking along its nose is usually nearer the ground. A snare so set will, however, give the kangaroo a chance to escape.

The wombat is sometimes so little alive to the approach of danger that he has been known not to budge from his position even when the passer-by has gently reminded him by the toe of his boot that he was in the way, and has continued unconcernedly grazing in spite of the insult. Though none of its senses are acute, its sense of hearing seems to be stronger than that of smell, for it will be aware of one's approach long before it realizes the direction in which one is coming. In such cases it assumes an attitude of expectation—its body will be rigid, the head slightly raised above the ground, with the little ears pricked. When it realizes the nearness of danger it makes a bolt in any direction, cantering much after the fashion of a pig, and should it be attacked by dogs will always seek to escape into the nearest hole, even if this should only afford cover for its head. It is in such places, where its body does not entirely disappear from view underground, or as in a hollow log, that new chums amongst dogs and men alike find, to their sorrow, that the animal's means of defence lie

in its back. To illustrate the way the wombat defends itself, no better example can be mentioned than that of a young man whose first acquaintance with a wombat cost him the entire skin of the upper part of his right hand. Desiring to capture the animal, he inserted his hand in the comfortable-looking opening above the animal's back, with the object of getting hold of and extricating it from its hiding-place. To his surprise and consternation the comfortable opening closed with lightning rapidity—the wombat having risen on its hind legs—and with a lateral to-and-fro motion of the hind quarters the young man's hand received a severe mauling against the sharp rock. Needless to say, the advice to insert the other hand below the animal and thus cause it to reverse its tactics was promptly acted upon, and the quick, simultaneous withdrawal of both hands left the wombat master of the situation, and saved further damage to the hand.

A wombat worried by dogs in an opening sufficiently big to cover its armpits will always make good its escape, for, while its hindquarters are busy with defence, its front legs are not idle. In an incredibly short space of time a quantity of earth is dug up and passed under its body by the front legs, and delivered outside by the hind ones with such force as sends the material flying for yards, and very much discourages the attentions of the dogs. Its efforts are accompanied by a growling not unlike that preceding a dog-fight, and the strenuous proceeding is continued until the body of the harassed animal quite disappears under the surface. When this occurs it becomes impracticable for it any longer to throw the soil out with its hind legs, and the material is pushed behind with the aid of its whole body, and the entrance closed.

(*To be continued.*)

National Parks.—A movement is on foot for the permanent reservation of sufficient land surrounding Mallacoota Inlet to make it both a scenic reserve and a game sanctuary, and as a means of furthering interest in the movement a free public lecture night will be held at the Melbourne Town Hall (reception room), on Friday evening, 26th March, when illustrated lectures will be given by Sir James Barrett, K.C.M.G., on Mallacoota; Mr. J. A. Kershaw, F.E.S., on Wilson's Promontory; and Dr. J. A. Leach, on the Fauna and Flora of Victoria. Members of the Field Naturalists' Club of Victoria are specially urged to attend and support the resolutions which will be submitted to the meeting, with the view of strengthening the hands of the National Parks Section of the Town Planning Association in the effort.

The Victorian Naturalist.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th March, 1920.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about sixty members and visitors were present.

CORRESPONDENCE.

From the Tasmanian Field Naturalists' Club, announcing a camp-out at Port Arthur for Easter.

From the National Park section of the Town Planning Association, announcing a series of lecturettes on 26th March.

REPORTS.

A report of a visit to the Zoological Gardens on Saturday, 14th February, was given by the chairman, who said that there had been a good attendance of members, who were favoured by a beautiful day. The director, Mr. D. Le Souëf, C.M.Z.S., and Mr. A. Wilkie had acted as guides, and had given to members a great deal of interesting information about the various animals, birds, &c. Many improvements had been noted, and the flower borders were especially brilliant. One of the newest additions, a platypus, was, unfortunately, in hiding, and could not be seen.

A report of the excursion to Melton on Saturday, 6th March, was given by the leader, Mr. F. G. A. Barnard, who said that the weather had turned out very trying, the wind and dust being most uncomfortable. The party found the country towards the Djerriwarrh Creek thoroughly parched, and little of interest was observed. A few trees of *Melaleuca parviflora* were struggling to bloom. At the creek some time was spent in a search for graptolites, but without success. A feature of the creek is the immense quantities of various-coloured pebbles to be found in its bed, many of which are traversed by thin bands of quartz. Attention was called to the patches of Mallee, *Eucalyptus Behriana*, F. v. M., seen in several places, and to the weathering of the basalt in the road-cuttings. The party walked on to Bacchus Marsh, and had an opportunity of seeing the method of irrigating the lucerne fields.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Owen Jones, chairman of the Forestry Board, Melbourne, and Miss L. Jones, O.B.E., Eye and Ear Hospital, Melbourne, were elected as ordinary members.

GENERAL BUSINESS.

Mr. J. Gabriel referred to the action which he had initiated some time ago towards getting rid of foxes on Phillip Island, The foxes, for which the Fisheries and Game Department and the Shire Council had each offered ten shillings per head, were again destroying large numbers of Mutton-birds. Notwithstanding the premium and the value of the skins, he understood that only ten foxes had been paid for.

Mr. C. J. Gabriel stated that not only Mutton-birds, but Black Swans and Ducks, were now being attacked. The two punctures on the heads of the dead birds were always present, and these denoted the teeth marks of the fox. Local hunters do not think the amount paid, plus the amount received for the skins, sufficient recompense for the trouble and expense involved, and suggestions have been made to ask for an increase of the amount. He moved that the Club ask the Fisheries Department to give a greater bonus for killing the foxes.

Mr. D. Best asked if any diminution in the number of arrivals of birds was noticed on arrival day.

Mr. J. Gabriel replied that the arrivals were very much diminished in the last few years, and that birds were not found in half the holes. He seconded the motion, which was then carried.

REMARKS ON EXHIBITS.

Mr. H. B. Williamson exhibited a specimen of the plant, the Woolly Water Lily, *Philhydrum lanuginosum*, Banks, collected by Mr. T. S. Hart, M.A., at Bairnsdale. This was reported as a new locality, the plant having been previously collected in Victoria only at the Grampians.

Mr. E. Cox referred to his exhibit of diseased "fry," collected at Lake Nagambie. He read a letter from the Fisheries and Game Department, which showed that each nodule in the dead fish contained an egg, which was, possibly, that of a parasitic worm. All the fish affected belonged to one species, probably a *Galaxias*. Small specimens of Cod and Perch showed no sign of infection.

Mr. C. Gabriel showed a collection of twenty species of Chiton shells, recently collected at Portland, remarking that that district was extremely rich in the genus.

Mr. C. Daly, B.A., referred to his exhibit of Agates from Anthony's Lagoon, Northern Territory, the locality where Sir Ross Smith was compelled to land with his aeroplane.

PAPERS READ.

By Mr. A. J. Shearsby, F.R.M.S. (communicated by Mr. F. Chapman, A.L.S.), entitled "Notes on the Occurrence of Recent Travertin Formations near Yass, N.S.W."

The author referred to this formation as being very rapid in 1919, owing to the light rainfall and the abnormal evaporation. The springs are, as a result, highly charged with lime, and, the water flowing over a mass of moss, roots, and other plants, is quickly evaporated, leaving the organic matter coated and cemented with the porous limestone.

By Mr. J. W. Audas, F.L.S., entitled "Through the Murra Murra Country (Western Grampians)."

The author described a visit to the Western Grampians in company with Mr. C. D'Alton. The bird and animal life were mentioned as very abundant and the flowers in profusion. Fine forests of Red Gum, Messmate, and Stringybark were traversed, the beauty of the scenery being emphasized. Fifty-one additional plants had been added to the list of the Grampians flora by his various trips in the district.

NATURAL HISTORY NOTES.

Mr. J. A. Kershaw, F.E.S., asked, in reference to an inquiry from the Western District, whether Black Swans had ever been found destructive to grass in the vicinity of lakes and watercourses.

Mr. C. Daley, B.A., remembered that at Sale complaints were made that the Swans did such damage on the shores of Lake Wellington.

The president referred to a Bald-Coot in the Botanic Gardens holding biscuits in its toes and eating them as a Cockatoo would do.

Mr. P. R. H. St. John confirmed the occurrence.

Mr. J. Gabriel remarked that the birds at the Botanic Gardens were different to any other birds in the world. There, also, the Black Ducks were seen walking among the visitors, and Brush Wattle-birds were noticed taking sugar out of the sugar-basins on the tea-house tables. He was not surprised at anything unusual in the ways of the birds at the Gardens.

EXHIBITS.

By Mr. F. G. A. Barnard.—Various types of pebbles from Djerriwarrh Creek, Melton, collected at excursion on 6th March.

By Mr. F. Chapman, A.L.S. — Specimens of travertin encrusting mint, water-cress, sheoke, and eucalyptus leaves, from Oaky and Ravenswood Creeks, near Yass, New South Wales, collected by Mr. A. J. Shearsby, F.R.M.S., in illustration of paper; also nest of Ring-tailed Possum, *Pseudochirus peregrinus*, Badd., found on cutting down a Sugar Gum at Balwyn.

By Mr. C. Cox.—Fry of Galaxias (?), apparently diseased, from Lake Nagambie.

By Mr. C. Daley, B.A., F.L.S.—Agates from Anthony's Lagoon, Northern Territory.

By Mr. C. J. Gabriel.—Collection of Chitons from Portland, including *Acanthochites granostriatus*, Pils., *Ischnochiton resplendens*, Bednall and Matthews; also a series of English marine shells, *Chlamys opercularis*, Linn.

By Mr. F. Pitcher.—Dried ferns and lycopods from Southern Otago, New Zealand, including twelve species which are also found in Victoria.

By Mr. A. L. Scott.—Microscopic section of basalt under polarized light, illustrating structure of basalt, met with on recent excursions.

By Mr. L. Thorn.—Live larvæ and pupæ of Imperial Blue Butterfly, *Ialmenus evagorus*, and Moonlight Blue Butterfly, *Miletus delicia*, also the perfect insects. The larvæ and pupæ of both these species are attended by small black ants.

By Mr. H. B. Williamson.—Specimens of *Alisma plantago*, L., Greater Water Plantain; *Damasonium australe*, Salisb., Star-fruit; *Goodenia paniculata*, Sm., Panicled Goodenia; *Philhydrum lanuginosum*, Banks, Woolly Water Lily (new for Eastern Victoria); and *Limnanthemum geminatum*, Griesb., collected at Bairnsdale by Mr. T. S. Hart, M.A.; also *Chenopodium carinatum*, F. v. M., Crested Goosefoot, *Euphorbia eremophila*, Cunn., Desert Spurge, collected at Kerang by Mr. E. J. Semmens.

After the usual conversazione the meeting terminated.

The Late Mr. George Sweet.—By the death on the 14th ult. of Mr. George Sweet, F.G.S., at the age of 75 years, the Field Naturalists' Club lost one of its earliest members. He was elected in July, 1886, and took considerable interest in the Club for many years, serving on the committee in 1894-5 and 1896-7. He acted as leader on several excursions when geology, his favourite study, was the object in view. He was a member of the expedition to King Island in November, 1887, and, at the request of Mr. C. C. Brittlebank, took part in an excursion to the Werribee Gorge in October, 1891 (*Vict. Nat.*, viii., p. 100), the result of that meeting being a joint paper on "The Glacial Deposits of Bacchus Marsh," read before the Adelaide (1893) meeting of the A.A.A.S. (vol. v., p. 376). He also did some good palæontological work at Mansfield in 1888 (*Vict. Nat.*, vii., p. 53). He was a prominent member of the Royal Society, and in other ways endeavoured to help his fellow man. His daughter, Dr. Georgina Sweet, D.Sc., also a member of the Club, is well known in scientific circles by her work at the biological and veterinary schools of the University.

WILD LIFE IN TASMANIA.

By G. WEINDORFER and G. FRANCIS.
(Communicated by Dr. C. S. SUTTON.)

(*Read before the Field Naturalists' Club of Victoria, 8th Dec.*, 1919.)

(*Continued from page* 160.)

The wombat is one of the few bush animals that roam the country at any time of day, especially if the weather be wet or overcast, though as a rule it prefers the night for feeding and exercise. Unlike so many other bush animals, it refuses to be "hypnotized" by the glare of an acetylene lamp, and the reflection of the light of their eyes is only accidental. The wombat would seem to rival the cat in its tenacity of life, and still makes efforts to escape even after experiencing the severest injuries.

The impression prevails that the wombat does not use its teeth as a means of defence. This is, perhaps, in one sense true, as the shortness of its neck does not allow it to turn its head sidewise, and any movement in the direction of its assailant must be followed out by its whole body simultaneously. This circumstance makes the animal too slow for the quick movements of the dog, and, knowing its disability, it does not waste any valuable time in trying to defend itself, but makes for cover as quickly as possible. Nevertheless, when circumstances were favourable, the wombat would, no doubt, use its teeth with formidable power. One caught in a hollow log, on being poked with a two-inch stick, promptly seized it with its teeth and bit it in pieces.

Amongst the animals of the bush the wombat is easily the most powerful. A young wombat which still finds refuge in its mother's pouch, if held as firmly as possible between the hands, will, with all its four legs simultaneously, work hard to get away, and will eventually free itself. To extricate a full-grown, unwounded wombat from a burrow, even with a rope attached to one of its hind legs, is impossible; and yet, as powerful as the animal may be as a whole, with one front paw caught in a springer snare it is rendered helpless. Under such conditions it does not attempt to burrow, neither does it attempt to escape; but let it be caught by one of its hind legs, and the chances are that in a short time springer and snare will have disappeared.

Like most animals, the wombat is an excellent swimmer, though no cases are known where it deliberately took to deep water. When worried by dogs, a creek or small water-hole will always appeal to it as one of the best means of escape. To test its swimming powers, one weighing about 50 lbs. was thrown into about 15 feet of water. Nearly 10 seconds

elapsed before it came to the surface, when the spitting, spluttering animal, swimming much after the fashion of a dog, its legs constantly under water, its mouth barely clearing the surface, made for the nearest shore, where dogs and man were waiting. It was again seized, and the performance was repeated twice, each time with the same result, with the only exception that its reappearances on the surface of the water were much quicker. Finally, nothing the worse for its first acquaintance with man, it relieved its dusky-coloured pelt of the adhering water by a vigorous shake, and, slowly waddling along, left the scene of the experiment. That the wombat can hold out under water for a considerable time was proved on an occasion when the brain of one was required for scientific purposes. Failing a gun, it was decided to drown the animal, and it took two men about five minutes to keep the animal under water until its struggles ceased.

With regard to its place of dwelling the wombat is by no means particular. When about two years old it will leave or be deserted by its mother, and will try here and there to burrow, as is evidenced all over the country by unsuccessful attempts to penetrate the rocky soil. As to the construction of the burrow, it would appear that the shape of it is mainly governed by circumstances. The entrance, however, which is invariably single, will always lead down at an angle of 10 to 15 degrees. The interior is devoid of bedding of any kind, and, as it is not always dry, it is no wonder that the animal is very fond of a sun bath amongst tufts of cutting-grass or against rocks and logs. It is tolerably certain that, while the male makes its burrow in the thick scrub, the female chooses an open situation for this purpose, where its young run less chance of being attacked by the tiger-cat or other frequenters of the former situation.

The breeding season of the wombat is not confined to any particular time of year, for at any time one—and only one—young, in different stages of development, may be found in the pouch. For that reason it is impossible to say how often a wombat becomes a mother. Observations on specimens held in captivity might throw light on the subject; but then, perhaps, the artificial conditions under which the animal would have to live would materially alter its habits.

The young wombat, when just too big for its mother's pouch, is easily tamed—in fact, there is no taming necessary. Once taken away from its mother, it will follow anything that moves—a man, a dog, or a horse (perhaps even a motor-car). They make admirable pets, but later on their propensity for burrowing, especially when executed in the vegetable or flower garden, makes them something of a nuisance. Once they

are accustomed to a place and master, they will never leave. In one of our small country towns it was an everyday sight to see an old lady going to the railway station for her mail followed by a pet wombat that was perfectly well aware of its mistress's dexterity in handling a stick on the approach of an over-confident dog.

The flesh of the wombat, as regards edibility, is easily first amongst that of bush animals. It is dark, though not quite so much so as that of the kangaroo, and may be compared in flavour with that of young beef. The skin is, however, removed with some difficulty, the bristles, especially on the back, growing right through from the flesh. As before mentioned, they make good mats, but are too porous for manufacture into leather.

MACROPUS RUFICOLLIS, VAR. BENNETTI, WATERH., BENNETT'S WALLABY.

Its fur enters the trade under the name of kangaroo, and the animal itself is generally called kangaroo. For reasons to be explained later on, the authors prefer to adhere to this name. Clive E. Lord, in his "Notes on the Mammals of Tasmania," 1918, page 32, describing the kangaroo (Bennett's Wallaby), says :—"Back of neck and rump bright rufous." In the Cradle Mountains and other high elevations further south and west, this variety is found. At times of heavy snowfalls on the mountains and other unpropitious weather conditions it may occasionally descend to lower altitudes, which are otherwise exclusively inhabited by a variety whose back of neck and rump are of dark grey colour. Besides the difference in colour, the variety of Lord seems to have a thinner but longer fur than the former, and offers shelter to an infinitely greater number of vermin. Furthermore, the scanty supply of good food in higher altitudes imprints its mark on the animal's condition, and the rocky nature of its environment has cultivated a foot whose under surface is covered with a far thicker horny substance. Otherwise, the habits of both varieties are identical, with the exception, perhaps, that the first-named is slower in its movements and falls an easier prey to dogs—most likely on account of its ignorance of danger.

In the early days of settlement by the Van Diemen's Land Co. at Middlesex, the presence of the kangaroo in the district was said to have been unknown ; but it is more likely that the kangaroo had been attacked by disease prior to the arrival of man, and had been almost wiped out for a time, as was the case with the wallaby in later years. Like the wallaby, it subsequently increased to large numbers, and these were undoubtedly supplemented by those driven back by advancing

settlement. In those days the kangaroo could hardly be called a night animal, for to see a dozen or more of them grazing on the plains in broad daylight was no uncommon thing. Nowadays, since their ranks have been sorely depleted by dog, snare, and gun, they are rarely seen in daytime out on the plains unless fleeing from danger or during the pairing season, which falls about October or November, according to locality and season.

The kangaroo is one of the greatest roamers of the bush. It has no definite home, but in choosing its locality will always prefer a warm and sunny spot in winter and a cool one in summer. Like the wombat, it does not live in pairs, and after the mating season the different sexes will keep strictly to themselves, which the snare seems to prove. In daytime it lies hidden under bushes, below rocks or tufts of cutting-grass. On the approach of danger it lies low, and only at the last moment takes to its heels. The younger animals are faster than the old ones, which, to avoid the dogs, are forced to have recourse to frequent "doublings." This is always done without the aid of the tail, as imprints in the snow clearly show. In any case, the tail is only used as a means of support while sitting, and during quick movements in level situations is kept off the ground in a slightly horizontal position, but comes into action in uneven ground as a means to preserve the equilibrium. In cases of emergency, when close pressed by the dogs, the mother will, during its flight, disposess itself of its young, which cannot be effected in any other way than with the help of its arms. The action takes places so quickly that, though some may be able to see the half-grown youngster thrown out on to the ground, the observers have never yet seen how it is done.

(*To be continued.*)

A FOSSIL BLUFF.—A rather unusual proclamation, that of an area of land on account of its geological interest, was made by the Lands Department of Tasmania in February last, when 7 acres 3 roods at Table Cape (Wynyard) was set aside as a reserved area for scientific purposes—viz., the preservation of fossils. A local syndicate had been endeavouring to secure the land and work it for manurial purposes, but the local Tourist Association opposed the scheme, and secured its permanent reservation, on account of its great interest to scientists and others.

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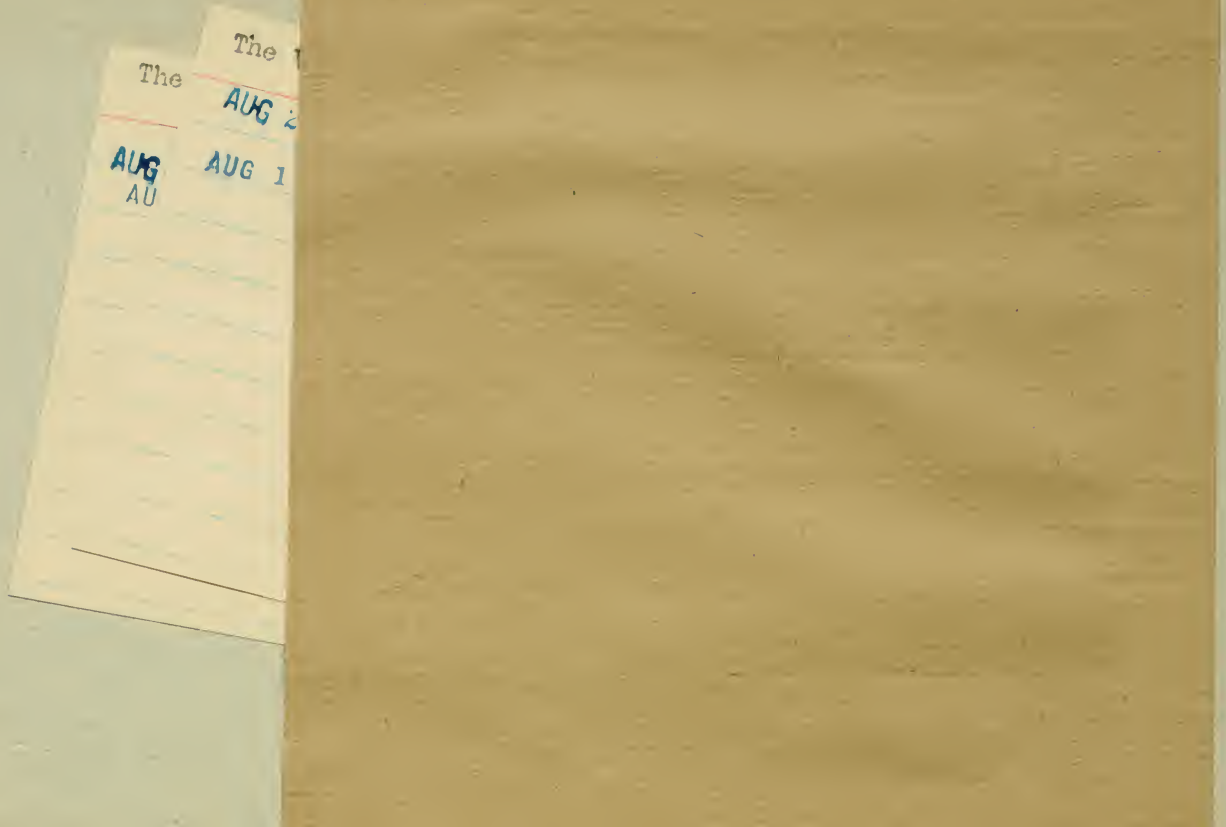
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